JOINT FLEET MAINTENANCE MANUAL

VOLUME VI

MAINTENANCE PROGRAMS

LIST OF EFFECTIVE PAGES

Page Numbers	Change in Effect	Page Numbers	Change in Effect
i thru xxx	REV C	VI-7C-1 thru VI-7C-2	REV C
VI-FWD-1 thru VI-FWD-2	REV C	VI-8-1 thru VI-8-6	REV C
VI-FWD-A-1 thru VI-FWD-A-8	REV C	VI-8A-1 thru VI-8A-2	REV C
VI-1-1 thru VI-1-2	REV C	VI-8B-1 thru VI-8B-2	REV C
VI-2-1 thru VI-2-10	REV C	VI-8C-1 thru VI-8C-2	REV C
VI-2A-1 thru VI-2A-4	REV C	VI-8D-1 thru VI-8D-2	REV C
VI-2B-1 thru VI-2B-2	REV C	VI-8E-1 thru VI-8E-2	REV C
VI-2C-1 thru VI-2C-2	REV C	VI-8F-1 thru VI-8F-2	REV C
VI-3-1 thru VI-3-8	REV C	VI-8G-1 thru VI-8G-2	REV C
VI-3A-1 thru VI-3A-2	REV C	VI-9-1 thru VI-9-16	REV C
VI-3B-1 thru VI-3B-2	REV C	VI-10-1 thru VI-10-4	REV C
VI-3C-1 thru VI-3C-4	REV C	VI-11-1 thru VI-11-6	REV C
VI-3D-1 thru VI-3D-2	REV C	VI-12-1 thru VI-12-4	REV C
VI-3E-1 thru VI-3E-2	REV C	VI-13-1 thru VI-13-4	REV C
VI-3F-1 thru VI-3F-2	REV C	VI-13A-1 thru VI-13A-14	REV C
VI-3G-1 thru VI-3G-4	REV C	VI-14-1 thru VI-14-4	REV C
VI-4-1 thru VI-4-6	REV C	VI-14A-1 thru VI-14A-2	REV C
VI-5-1 thru VI-5-14	REV C	VI-15-1 thru VI-15-2	REV C
VI-5A-1 thru VI-5A-8	REV C	VI-16-1 thru VI-16-8	REV C
VI-6-1 thru VI-6-4	REV C	VI-16A-1 thru VI-16A-2	REV C
VI-6A-1 thru VI-6A-6	REV C	VI-16B-1 thru VI-16B-2	REV C
VI-7-1 thru VI-7-34	REV C	VI-16C-1 thru VI-16C-2	REV C
VI-7A-1 thru VI-7A-4	REV C	VI-17-1 thru VI-17-2	REV C
VI-7B-1 thru VI-7B-2	REV C	VI-18-1 thru VI-18-4	REV C

Page Numbers	Change in Effect
VI-19-1 thru VI-19-8	REV C
VI-19A-1 thru VI-19A-40	REV C
VI-19B-1 thru VI-19B-2	REV C
VI-19C-1 thru VI-19C-78	REV C
VI-19D-1 thru VI-19D-2	REV C
VI-19E-1 thru VI-19E-2	REV C
VI-19F-1 thru VI-19F-2	REV C
VI-20-1 thru VI-20-4	REV C
VI-20A-1 thru VI-20A-2	REV C
VI-20B-1 thru VI-20B-2	REV C
VI-20C-1 thru VI-20C-2	REV C
VI-21-1 thru VI-21-4	REV C
VI-21A-1 thru VI-21A-2	REV C
VI-21B-1 thru VI-21B-2	REV C
VI-21C-1 thru VI-21C-2	REV C
VI-21D-1 thru VI-21D-2	REV C
VI-21E-1 thru VI-21E-6	REV C
VI-21F-1 thru VI-21F-4	REV C
VI-21G-1 thru VI-21G-6	REV C
VI-22-1 thru VI-22-4	REV C
VI-22A-1 thru VI-22A-2	REV C
VI-23-1 thru VI-23-6	REV C
VI-23A-1 thru VI-23A-2	REV C
VI-23B-1 thru VI-23B-2	REV C
VI-23C-1 thru VI-23C-30	REV C
VI-23D-1 thru VI-23D-2	REV C
VI-23E-1 thru VI-23E-4	REV C
VI-23F-1 thru VI-23F-2	REV C
VI-24-1 thru VI-24-10	REV C
VI-24A-1 thru VI-24A-2	REV C
VI-24B-1 thru VI-24B-2	REV C
VI-24C-1 thru VI-24C-4	REV C
VI-24D-1 thru VI-24D-2	REV C
VI-24E-1 thru VI-24E-2	REV C
VI-24F-1 thru VI-24F-2	REV C
VI-25-1 thru VI-25-8	REV C
VI-25A-1 thru VI-25A-2	REV C
VI-25B-1 thru VI-25B-2	REV C
VI-25C-1 thru VI-25C-2	REV C
VI-25D-1 thru VI-25D-2	REV C
VI-25E-1 thru VI-25E-2	REV C
VI-25F-1 thru VI-25F-2	REV C
VI-26-1 thru VI-26-2	REV C
VI-27-1 thru VI-27-4	REV C
VI-27A-1 thru VI-27A-2	REV C
VI-27B-1 thru VI-27B-2	REV C
VI-27C-1 thru VI-27C-2	REV C
VI-28-1 thru VI-28-4	REV C
VI-28A-1 thru VI-28A-2	REV C
VI-29-1 thru VI-29-2	REV C
VI-29A-1 thru VI-29A-2	REV C
VI-30-1 thru VI-30-2	REV C
VI-31-1 thru VI-31-8	REV C
VI-31A-1 thru VI-31A-8	REV C
VI-32-1 thru VI-32-16	REV C
VI-32A-1 thru VI-32A-2	REV C
VI-33-1 thru VI-33-6	REV C
VI-33A-1 thru VI-33A-12	REV C
VI-34-1 thru VI-34-4	REV C
VI-35-1 FOR FUTURE USE	

Page Numbers	Change in Effect
VI-36-1 thru VI-36-12	REV C
VI-36A-1 thru VI-36A-4	REV C
VI-36B-1 thru VI-36B-22	REV C
VI-36C-1 thru VI-36C-6	REV C
VI-36D-1 thru VI-36D-4	REV C
VI-36E-1 thru VI-36E-4	REV C
VI-36F-1 thru VI-36F-4	REV C
VI-37-1 thru VI-37-6	REV C
VI-38-1 thru VI-38-8	REV C
VI-38A-1 thru VI-38A-8	REV C
VI-38B-1 thru VI-38B-2	REV C
VI-38C-1 thru VI-38C-2	REV C
VI-39-1 thru VI-39-4	REV C
VI-39A-1 thru VI-39A-2	REV C
VI-40-1 thru VI-40-4	REV C
VI-40A-1 thru VI-40A-2	REV C
VI-40B-1 thru VI-40B-2	REV C
VI-40C-1 thru VI-40C-2	REV C
VI-40D-1 thru VI-40D-2	REV C
VI-40E-1 thru VI-40E-2	REV C
VI-41-1 thru VI-41-10	REV C
VI-41A-1 thru VI-41A-2	REV C
VI-42-1 thru VI-42-8	REV C
VI-42A-1 thru VI-42A-4	REV C
VI-42B-1 thru VI-42B-2	REV C
VI-42C-1 thru VI-42C-2	REV C
VI-42D-1 thru VI-42D-2	REV C
VI-42E-1 thru VI-42E-2	REV C
VI-43-1 thru VI-43-2	REV C
VI-44-1 thru VI-44-2	REV C
VI-44A-1 thru VI-44A-2	REV C

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JOINT FLEET MAINTENANCE MANUAL

VOLUME VI

MAINTENANCE PROGRAMS

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JOINT FLEET MAINTENANCE MANUAL

VOLUME VI

MAINTENANCE PROGRAMS

TABLE OF CONTENTS

CHAPTER 4 - SHIPBOARD ELECTROMAGNETIC COMPATIBILITY

CHAPTER 5 - DEFICIENCY DOCUMENTATION AND REPORTING

CHAPTER 9 - METROLOGY AND CALIBRATION PROGRAM

CHAPTER 10 - MOTOR GASOLINE HANDLING AND STORAGE

CHAPTER 11 - MAINTENANCE, REPAIR AND OVERHAUL OF SERVICE CRAFT, LANDING CRAFT AND SMALL BOATS

CHAPTER 12 - DEGAUSSING

CHAPTER 16 - HABITABILITY

CHAPTER 17 - IMPRESSED CURRENT CATHODIC PROTECTION

CHAPTER 18 - INFLATABLE LIFE RAFTS

CHAPTER 20 - WEIGHT AND MOMENT CONTROL FOR SUBMARINES

CHAPTER 21 - SUBMARINE STORAGE BATTERIES

CHAPTER 22 - TRIDENT SYSTEM AND EQUIPMENT MAINTENANCE PLANS

CHAPTER 23 - SUBMARINE NOISE REDUCTION

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 U.S. Naval Ships
(c) COMLANTFLTINST 5400.2 - U.S. Atlantic Fleet Regulations
(d) COMPACFLTINST 5400.3 - U.S. Pacific Fleet Regulations
(e) NAVSEAINST 4790.8/OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(f) SSPINST 4720.1 - Policies and Procedures for Alteration of Strategic Weapon System Equipment

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. The Foreword 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 Naval Sea Systems Command Nuclear Propulsion Directorate (NAVSEA 08) is maintained in accordance with NAVSEA 08 directives.

c. Nuclear-Powered Ballistic Missile Submarine (SSBN) Strategic Weapon System (SWS) and Nuclear-Powered Guided Missile Submarine (SSGN) Attack Weapons Systems (AWS) equipment under the cognizance of Strategic Systems Programs (SSP) is operated, maintained, modified and/or modernized in accordance with approved SSP directives/instructions.

(1) Reference (f) defines policies, controls, processes and procedures for the accomplishment of all SSP Alterations (SPALT) issued by the Director, Strategic Systems Programs for all SSP cognizant equipment on both SSBNs and SSGNs. Reference (f) further defines the methodology and processes to plan, document, coordinate, install, and test SWS/AWS hardware, software and/or modernization SPALTs.

(2) Adherence to reference (f) ensures that all related or affected Equipment, Fleet Documentation, Training, Logistic and Maintenance functions under the cognizance of SSP are fully integrated as part of the SPALT. Only SSP authorized SWS/AWS SPALTs are installed on SSBNs and SSGNs.

(3) Applicable and required local support services such as Crane, Riggers, Power Isolation/Tag-Out, Hazardous Material, Quality Assurance/Critical Skill requirements, etc., for the conduct of a SPALT shall be identified within the Director, Strategic Systems Programs SPALT document, related Ordnance Document, and/or SPALT installation pre-brief. This information shall be communicated/provided to all involved and affected local activities in accordance with the SPALT process no later than forty-five (45) days prior to the conduct of a SPALT, as outlined and defined within reference (f).

(4) As SSP Contractor/Government Team shall provide the required operational and engineering support for all SPALT, Maintenance and Repair Activities to SWS/AWS equipment under the cognizance of SSP. The respective responsibilities of SSP Contractor/Government Teams, the Fleet Maintenance Activity and other local Commands for the execution of the SSP SPALT program shall be documented in an overarching Memorandum of Agreement in order to define areas of responsibility for all activities involved in the accomplishment of authorized alterations in a timely, efficient, and coordinated manner.

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

2-Kilo	3-M Maintenance Action Form
2M	Miniature/Microminiature
3-M	Maintenance and Material Management
3-MC	Maintenance and Material Management Coordinator
3-MPR	3-M Performance Rate
A&I	Alteration and Improvement
ACAT	Acquisition Category
ACCCIT	Aircraft Carrier Climate Control Investigating Team
ACF	Accomplishment Confidence Factor
ACN	Advance Change Notice
ACO	Administering Contracting Officer
ADP	Automated Data Processing
AEL	Allowance Equipage List
AER	Alteration Equivalent to Repair
AERP	Advanced Equipment Repair Program
AF	Advance Funding
AFOM	Alteration Figure of Merit
AIMD	Aviation Intermediate Maintenance Department
AIS	Automated Information Systems
AIT	Alteration Installation Team
Ao	Operational Availability
AOR	Area of Responsibility
AP	Advance Planning
APL	Allowance Parts List
APPN/PE	Appropriation/Preliminary Engineering
ARRS	Analysis, Records and Reports Section
ASDS	Advanced SEAL Delivery System
ASI	Automated Shore Interface
ASTM	American Society for Testing and Materials
ATE	Automated Test Equipment
AWP	Availability Work Package
AWR	Automated Work Request
AWS	Attack Weapons Systems
BAF	Business Adjustment Factor
BART	Beartrap Acoustic Radiated Trials
BCA	Business Case Analysis
BCE	Battery Charging Electrician
BCEF	Battery Charging Electrician Forward
BER	Beyond Economical Repair
BRB	Battery Record Book
BSC	Balanced Score Card
C5RA	Combat Systems, Command, Control, Communications and Computer Readiness Review
CAL STD	Calibration Standard
CAQAP	Contract Administration Quality Assurance Program
CAR	Corrective Action Request
CAS	Contract Administration Services
CASCAN	CASREP Cancellation or Cancellation of Casualty Report

CASCOR	CASREP Correction or Correction of the Casualty in the Casualty Report
CASREP	Casualty Report
CBA	Cost Benefit Analysis
CCT	Customer Contract Team
CD-ROM	Compact Disk - Read Only Memory
CEIPRP	Continuous Estimating Incremental Planning Review Process
CFOSS	Cargo Fuel Operational Sequencing System
CFT	Cross Functional Team
CHENG	Chief Engineer
CM	Continuous Maintenance
CMAV	Continuous Maintenance Availability
CMF	Confidence Management Factor
CMO	Contract Management Office
CMP	Class Maintenance Plan
CNO	Chief of Naval Operations
COMUSFLTFORCOM	Commander, United States Fleet Forces Command
COMLANTFLT	Commander, Atlantic Fleet
COMLOGWESTPAC	Commander Logistics Western Pacific
COMNAVAIRFOR	Commander Naval Air Forces
COMNAVAIRLANT	Commander Naval Air Force Atlantic
COMNAVAIRPAC	Commander Naval Air Force Pacific
COMNAVAIRSYSCOM	Commander, Naval Air Systems Command
COMNAVRESFOR	Commander Naval Reserve Force
COMNAVSEASYSCOM	Commander, Naval Sea Systems Command
COMNAVSURFGRUMIDPAC	Commander Naval Surface Group Middle Pacific
COMNAVSURFGRUPACNORWEST	Commander Naval Surface Group Pacific North West
COMNAVSURFLANT	Commander Naval Surface Force Atlantic
COMNAVSURFOR	Commander Naval Surface Forces
COMNAVSURFPAC	Commander Naval Surface Force Pacific
COMPACFLT	Commander, Pacific Fleet
COMPATRECONFORLANT	Commander Patrol Reconnaissance Forces Atlantic
COMPATRECONFORPAC	Commander Patrol Reconnaissance Forces Pacific
COMSPAWARSYSCOM	Commander, Space and Naval Warfare Systems Command
COMSUBGRU	Commander Submarine Group
COMSUBLANT	Commander Submarine Force Atlantic
COMSUBPAC	Commander Submarine Force Pacific
COMSUBRON	Commander Submarine Squadron
COMUSFLTFORCOM	Commander United States Fleet Forces Command
COSAL	Coordinated Shipboard Allowance List
CPO	Chief Petty Officer
CPR	Calibration Problem Report
CQA	Contract Quality Assurance
CREI	Cost Reduction and Effectiveness Improvement
CRES	Corrosion Resistant Steel
CRL	Calibration Requirements List
CS	Combat Systems
CS/CCS	Command and Control Systems
CSMP	Current Ship's Maintenance Project
CTL	Class Team Leader
CTRA	Consolidated TMDE Readiness Assessment
CVF	CSMP Validity Factor
CVN	Nuclear Powered Aircraft Carrier
CWP	Controlled Work Package
CYBERFOR	Cyber Force

DCMA	Defense Contract Management Agency
DS	Dry Deck Shelter
Det/DET	Detachment
DFS	Departure From Specification
DLR	Depot Level Repairable
DMP	Depot Modernization Period
DO	Duty Officer
DoD	Department of Defense
DPP	Deployment Preparation Period
DRRS	Defense Readiness Reporting System
DSN	Defense Switched Network
DSRA	Dry-Docking Selected Restricted Availability
DSS	Deep Submergence System
EDO	Engineering Duty Officer
EGL	Equipment Guide List
EIC	Equipment Identification Code
EM	Electronic Module
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMO	Electronics Material Officer
EOC	Equipment Operational Capability
EPCP	Electric Plant Control Panel
EPY	Expanded Planning Yard
EQOL	Enhanced Quality Of Life
ERR	Engineering Readiness Review
ESC	Executive Steering Committee
ESD	Electrostatic Discharge
ESL	Equipment Status Log
ETR	Estimated Time to Repair
FC	Field Change
FCA	Field Calibration Activity
FCFBR	Fleet COSAL Feedback Report
FFP	Firm Fixed Price
FLR	Field Level Repairable
FMA	Fleet Maintenance Activity
FMP	Fleet Modernization Program
FMPMIS	Fleet Modernization Program Management Information System
FPY	First Pass Yield
FS&L	Food Service and Laundry
FTA	Fleet Technical Assistance
FY	Fiscal Year
GDSC	Global Distance Support Center
GPETE	General Purpose Electronic Test Equipment
GSI	Government Source Inspection
HIP	Hull Integrity Procedure
HM&E	Hull, Mechanical and Electrical
HMERA	Hull, Mechanical, Electrical Readiness Assessment
HRMC	Hawaii Regional Maintenance Center
HW	Hot Wash
HWAT	Hot Wash Analysis Team

ICAS	Integrated Condition Assessment System
ICCP	Impressed Current Cathodic Protection
ICR	Independent Cost Review
ICV	Individual Cell Voltage
IGE	Independent Government Estimate
ILRRR	Inflatable Life Raft Recertification Record
ILS	Integrated Logistics Support
IMA	Intermediate Maintenance Activity
IMF	Intermediate Maintenance Facility
IMI	Intermodulation Interference
INSURV	Board of Inspection and Survey
IPE	Industrial Plant Equipment
ISEA	In-Service Engineering Activity
ISIC	Immediate Superior In Command
IT	Information Technology
IUID	Item Unique Identification
JCN	Job Control Number
JFMM	Joint Fleet Maintenance Manual
JRMC	Japan Regional Maintenance Center
JSN	Job Sequence Number
LCM	Life Cycle Manager
LDS	Logistics Data System
LLC	Lessons Learned Conference
LMA	Last Maintenance Action
LMA	Lead Maintenance Activity
LOD	Letter of Delegation
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
MDT	Mean Down Time
MEASURE	Metrology Automated System for Uniform Recall and Reporting
METCAL	Metrology and Calibration
MFOM	Maintenance Figure of Merit
MFOMa	Average Maintenance Figure of Merit
MFOMw	Weighted Maintenance Figure of Merit
MILCON	Military Construction
MILSPEC	Military Specification
MIP	Maintenance Index Page
MJC	Master Job Catalog
MMBP	Maintenance and Modernization Business Plan
MMP	Major Maintenance Period
MMPR	Maintenance and Modernization Performance Review
MOA	Memorandum of Agreement
MOGAS	Motor Gasoline
MP	Modernization Plan
MPR	MDS Performance Rate

MR	Maintenance Requirement
MRC	Maintenance Requirement Card
MRI	Machine-Readable Information
MRMS	Maintenance Resource Management System
MS	Maintenance Standard
MSDS	Material Safety Data Sheet
MSF	Magnetic Silencing Facility
MS/MO	Multi-Ship/Multi-Option
MSRA	Module Screening and Repair Activity
MSS	Major Shore Spares
MTBF	Mean Time Between Failures
MTR	Module Test and Repair
MTRF	Module Test and Repair Facility
NACE	National Association of Corrosion Engineers
NAVAIR	Naval Air Systems Command
NAVICP	Naval Inventory Control Point
NAVSEA	Naval Sea Systems Command
NAVSEA 08	Naval Sea Systems Command Nuclear Propulsion Directorate
NAVSEALOGCEN	Naval Sea Logistics Center
NAVSUP	Naval Supply Systems Command
NC	Critical Noise Deficiency
NCR	No Calibration Required
NDE	Navy Data Environment
NDE-NM	Navy Data Environment-Navy Modernization
NDT	Nondestructive Testing
NEC	Navy Enlisted Classification
NFE	No Fault Evident
NGDSC	Navy Global Distance Support Center
NIIN	National Item Identification Number
NMD	Navy Maintenance Database
NMP	Navy Modernization Process
NP	Potential Noise Deficiency
NPBI	NAVSEA Paint Basic Inspector
NPV	Net Present Value
NRPO	Noise Reduction Petty Officer
NSA	Naval Supervisory Authority
NSN	National Stock Number
NSSA	Norfolk Ship Support Activity
NSSC	Naval Submarine Support Center
NSTM	Naval Ship's Technical Manual
NSWC	Naval Surface Warfare Center
NSWCCD	Naval Surface Warfare Center, Carderock Division
NSY	Naval Shipyard
NUCALT	Nuclear Alteration
NWRMC	Northwest Regional Maintenance Center
OARS	Open Architecture Retrieval System
OJT	On the Job Training
OMMS	Organizational Maintenance Management System
OMMS-NG	Organizational Maintenance Management System – Next Generation
OOC	Out Of Commission
OOD	Officer Of the Deck
OPALT	Operational Alteration
OPNAV	Office of the Chief of Naval Operations
OPNAVINST	Office of the Chief of Naval Operations Instruction

OPTAR	Operating Target
ORATA	Other Restricted Availability/Technical Availability
ORDALT	Ordnance Alteration
PARM	Participating Managers
PCMS	Passive Countermeasure System
PDS	Product Data Sheet
PEO	Program Executive Officer
PEP	Plant Equipment Project
PFR	Periodic Force Revision
PHD	Port Hueneme Detachment
PHNSY	Pearl Harbor Naval Shipyard
PHNSY-IMF	Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility
PIRA	Pre-Inactivation Restricted Availability
PLAD	Plain Language Address Directory
PM	Program Manager
PMR	Periodic Maintenance Requirement
PMS	Planned Maintenance System
PMT	Performance Monitoring Team
POC	Point of Contact
POM	Pre-Overseas Movement
PPE	Personal Protective Equipment
PPR	PMS Performance Rate
PQS	Personnel Qualification Standard
PRWL	Planned Refit Work List
PSNS	Puget Sound Naval Shipyard
PSNS-IMF	Puget Sound Naval Shipyard and Intermediate Maintenance Facility
PVI	Product Verification Inspection
PY	Planning Yard
QA	Quality Assurance
QAR	Quality Assurance Representative
QBR	Quarterly Battery Report
QC	Quality Control
QOS/QOL	Quality of Service/Quality of Life
RAB	Registrar Accreditation Board
RAF	Reporting and Automated Shore Interface Processing Confidence Factor
RAR	Recorded Accomplishment Rate
RCC	Regional Calibration Center
RCM	Reliability Centered Maintenance
RCP	Recommended Change Package
REC	Re-Entry Control
RFI	Ready For Issue
RH	Relative Humidity
RIP	Readiness Improvement Program
RLP	Regional Loan Pool
RMAIS	Regional Maintenance Automated Information System
RMC	Regional Maintenance Center
ROI	Return On Investment
ROV	Repair Other Vessel
RPCCR	Reactor Plant Configuration Change Report
RPPO	Repair Parts Petty Officer
RPSM	Reactor Plant Ship Modification
RSG	Regional Support Group

SC	Ship Change
SCAT	Sub-Category
SCD	Ship Change Document
SCLSIS	Ship's Configuration and Logistics Support Information System
SCP	System Calibration Procedures
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
SERMC	Southeast Regional Maintenance Center
SF	Ship's Force
SFWL	Ship's Force Work List
SG	Specific Gravity
SGCP	Shipboard Gage Calibration Program
SHIPALT	Ship Alteration
SHIPMAIN	Ship Maintenance
SHW	Super Hot Wash
SISCAL	Shipboard Instrumentation System Calibration
SKED	Scheduling Software
SLICR	Ship's Logistics Indicator Computerized Report
SME	Subject Matter Expert
SNAP	Ship's Non-Tactical Automated Data Processing System
SOC	Scope of Certification
SOS	Source of Support
SOVT	System Operation Verification Testing
SPALT	Strategic Systems Programs Alteration
SPAWAR	Space and Naval Warfare Systems Command
SPETE	Special Purpose Electronic Test Equipment
SPETERL	Ship's Portable Electronic Test Equipment Requirements List
SPM	Ship's Program Manager
SPRUCE	Scheduled Preservation Upkeep Coordinated Effort
SRA	Selected Restricted Availability
SRF	Ship Repair Facility
SRF-JRMC	Ship Repair Facility and Japan Regional Maintenance Center
SSBN	Nuclear-Powered Ballistic Missile Submarine
SSES	Ship Systems Engineering Station
SSGN	Nuclear-Powered Guided Missile Submarine
SSM	Ship Systems Manual
SSP	Strategic Systems Programs
SSPC	Society for Protective Coatings
SSPINST	Strategic Systems Programs Instruction
SSR	Ship's Selected Records
ST1	Surface Team One
STAN	Shipboard Electromagnetic Compatibility Improvement Program Technical Assistance Network
STSC	Submarine Technical Support Center
SUBMEPP	Submarine Maintenance Engineering, Planning and Procurement Activity
SUBSAFE	Submarine Safety
SUPSHIP	Supervisor of Shipbuilding
SUPSHIP NN	Supervisor of Shipbuilding Newport News
SURFMEPP	Surface Maintenance Engineering Planning Program Activity
SURFOR	Surface Force

SWE	Surface Warfare Enterprise
SWLIN	Ship Work List Item Number
SWRMC	Southwest Regional Maintenance Center
SWS	Strategic Weapon System
SYSCOM	Systems Command
TA	Technical Analyst
T/A	Type of Availability
TAMS	TYCOM Alteration Management System
TAMS	Test and Monitoring System
TAR	Technical Analysis Report
TAT	Technical Assessment Team
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
TMA	Top Management Attention
TMDE	Test, Measurement and Diagnostic Equipment
TMDER	Technical Manual Deficiency/Evaluation Report
TMI	Top Management Issues
TOMA	Technical Onboard Monitoring Assist
T(pf)	Time (problem free)
TPOC	Technical Point of Contact
TPS	Test Program Set
TRF	TRIDENT Refit Facility
TRIPER	TRIDENT Planned Equipment Replacement
TRIREFFAC	TRIDENT Refit Facility
TRS	Technical Repair Standard
TSRA	Total Ship's Readiness Assessment
TVG	Temperature Voltage Gassing
TYCOM	Type Commander
TYKIT	TYCOM Alteration Kit
TZ	Type Zero
UIC	Unit Identification Code
URO	Unrestricted Operation
VIDS/MAF	Visual Information Display/Maintenance Action Form
WC	Work Center
WCS	Work Center Supervisor
WCWL	Work Center Work List
WFT	Wet Film Thickness
WP	Work Package
WPIC	Work Package Integration Conference
WPS	Work Package Supplement

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 389-0288 - Radiological Controls
(c) NAVSEA S0600-AA-PRO-280 - Underwater Ship Husbandry Manual, Chapter 28: Pollution Prevention

1.1 PURPOSE. To implement the program requirements delineated in references (a) and (b) and to provide guidance for waterborne hull cleaning of naval ships. This process applies to all surface force, submarines and aircraft carrier ships.

1.2 SCOPE. As stated in reference (a), commercial and Naval experience has demonstrated that appreciable savings in energy are obtainable by maintaining smooth underwater hull and propeller surfaces through periodic waterborne hull cleaning. Additionally, a hull cleaning program provides a means in which hull damage can be detected in early stages and corrective action can be taken. 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 waterborne underwater ship inspection and cleaning. Reference (a) provides a rating scale for inspecting and reporting fouling, fouling thresholds to initiate cleaning, approved cleaning equipment for various underwater ship systems (i.e., hull sections, appendages, dome, masker/prairie air), cleaning requirements, safety precautions and procedures for cleaning, 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 deployment.

1.3 POLICY.

a. Scheduling of periodic cleaning will be the responsibility of the Type Commander (TYCOM) and accomplished in accordance with reference (a). Full, partial and interim cleaning shall be accomplished by diving activities (military and civilian) certified by Naval Sea Systems Command (NAVSEA) code 00C.

b. Full hull cleaning will only be accomplished by NAVSEA divers contracted for world wide waterborne underwater hull cleaning services. Interim or partial hull cleaning will be done by a certified navy activity or NAVSEA contracted service.

c. The execution of waterborne underwater hull cleaning operations shall follow best management practices delineated in reference (c) to maximize hull cleaning effectiveness and to minimize the release of hull cleaning by-products into surrounding waters.

1.4 RESPONSIBILITIES. An effective hull cleaning program that ensures the delivery of reliable, environmentally sound, and quality services to the Fleet requires the well-coordinated effort of several organizations. Together, these groups must manage the planning, execution, quality assurance, inspection and condition-reporting functions necessary to ensure the work is performed efficiently and in accordance with technical specifications. Reference (c), Appendix A, Section II specifies the responsibilities for each organization (NAVSEA code 00C, Commander United States Fleet Forces Command, TYCOMs, On-Scene Navy Representative, and the Ship's Chief Engineer) involved in the hull cleaning program.

1.5 REPORTS. All waterborne underwater hull cleaning and inspection shall be documented and submitted to the respective TYCOM and NAVSEA 00C for review. Documentation for cleaning submarines shall also be transmitted to SUBMEPP Code 1844. Documentation for cleaning and inspection of aircraft carrier hulls shall also be transmitted to PMS 312C Carrier Planning Activity, Code 22. Inspection results shall be recorded on the standard Diver Hull Inspection Data form (NAVSEA 4730 available on-line at http://www.supsalv.org). The inspection documentation may be mailed or electronically stored and transmitted to the appropriate organizations.

Mailing addresses are as follows:

COMNAVSEASYSCOM
Attn: NAVSEA 00C5
1333 Isaac Hull Avenue S.E. Stop 1075
Washington Navy Yard, DC 20376-1075

Commanding Officer
SUBMEPP Activity
PO Box 2500
Portsmouth Naval Shipyard
Portsmouth, NH 03804-2500

Commanding Officer
PEO Carriers PMS 312C
Bldg 33
Portsmouth, VA 23709-5091

VOLUME VI

CHAPTER 2

FLEET TECHNICAL ASSISTANCE

REFERENCES.

(a) COMUSFLTFORCOM/COMPACFLTINST 3501.3 - Fleet Training Continuum

(b) OPNAVINST 3000.15 - Fleet Response Plan (FRP)

LISTING OF APPENDICES.

A Area Regional Maintenance Center Fleet Technical Assistance Contact Information

B Sample Technical Assistance Visit Report (TAVR) Message

C Sample E-MAIL Technical Assistance Visit Report (E-TAVR)

2.1 PURPOSE. This chapter provides policy, procedures and guidance regarding utilization of Fleet Technical Assistance (FTA) program resources in support of all surface ships, aircraft carriers, submarines and craft. Commander, U. S. Fleet Forces Command 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 FLEET TECHNICAL ASSISTANCE DEFINITION. FTA is the help that surface ships, aircraft carriers, submarines and craft request when they are unable to resolve equipment or software deficiencies using their own ships resources or other means available within their Strike Group. Paragraph 2.4.2 of this chapter lists FTA program exclusion items. Use of Regional Maintenance Center (RMC) or RMC-obtained resources for other purposes, such as non-Ship's Force repairs, assessments, Board of Inspection and Survey inspections, etc., is not considered FTA but is addressed elsewhere in this manual or other policy guidance. All FTA requests will be responded to by the RMCs as defined in paragraph 2.4.1 of this chapter.

2.3 FLEET TECHNICAL ASSISTANCE EXCLUSION AREAS. RMCs are not responsible for technical assistance in the following areas:

a. Naval Sea Systems Command (NAVSEA) 08 cognizant equipment.

b. TRIDENT missile weapons systems.

c. Aircraft.

d. Catapults and arresting gear - Aircraft Launch and Recovery Equipment.

e. Ordnance and munitions.

f. Submarine Safety systems/components.

g. Nuclear weapons.

h. Special clearance equipment.

i. Undersea and land-based surveillance equipment.

j. Flight deck certification related systems and equipment.

k. Diver life support systems.

l. Non-Program of Record (pre-prototype) programs.

2.4 FLEET TECHNICAL ASSISTANCE POLICY.

NOTE: WHEN CONTACTING THE NAVY GLOBAL DISTANCE SUPPORT CENTER (NGDSC) OR AN AREA RMC, UTILIZE SECURE COMMUNICATIONS AS APPROPRIATE TO MAINTAIN SECURITY OF CLASSIFIED EQUIPMENT AND OPERATIONAL PARAMETERS.

2.4.1 Requesting Assistance. It is important that ships develop and exercise self-sufficiency for shipboard system maintenance to the fullest extent possible. If unable to resolve a technical problem internally, the ship shall contact the NGDSC, who will route their request to the cognizant Area RMC. If unable to contact the NGDSC, contact the Area RMC. Ships will use the following specific procedures when requesting FTA:

a. When a technical assistance requirement is identified, contact the NGDSC as described in paragraph 2.4.1.b of this chapter. The NGDSC will then record the FTA request and forward to the appropriate RMC as outlined in paragraph 2.7.2 of this chapter using the contact information in Appendix A. Provide pertinent information listed in paragraph 2.4.2 of this chapter.

b. The NGDSC can be contacted 24-hours a day via the worldwide web, by E-mail, via Naval message or via toll-free numbers as follows:

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

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

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

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

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

(6) Telephone: Comm 1-877-418-6824, DSN 510-428-6824

2.4.2 Required Fleet Technical Assistance Request Information. A Casualty Report (CASREP) solely to establish an FTA, is not required. When requesting Technical Assistance, the following information is **necessary** to assist in a timely and accurate response:

a. Job Control Number (JCN) (required) and Casualty Report (if applicable) numbers.

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

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

d. Repair actions taken to date: [Include any extra-unit assistance (e.g., Ship Repair Facility, Tender, etc.)].

e. Parts status: (Indicate spare parts required, document numbers, document status, etc., if known).

f. Technical manual: (NAVSEA/NAVSHIPS/NAVORD Technical manual number or Commercial Off-The-Shelf manufacturer's publication identification, if available).

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

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

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

j. Manufacturer of equipment for which assistance is required (if known).

k. Equipment Allowance Parts List/Record Identification Number.

l. Commanding Officer assessment as to effect on ship’s mission in the event Distance Support is unsuccessful.

2.4.3 Chief of Naval Operations Availability Fleet Technical Assistance Procedures. Fleet units may request technical assistance while in a Chief of Naval Operations scheduled maintenance availability. The request must be submitted to the cognizant Area RMC, which will coordinate with the appropriate Naval Supervising Authority (NSA) (if not the same as the cognizant Area RMC) for technical assistance related to systems/equipment that are

under the NSA's cognizance or are part of an availability work package. When the cognizant Area RMC is the NSA, the RMC will provide technical support. If not the NSA, the cognizant Area RMC may also do so, as necessary/coordinated with the NSA.

2.4.3.1 Initial Response. The initial response to all FTA requests will be via Distance Support. If the Operational Commander or Type Commander (TYCOM) determines on-site support is necessary, it is incumbent on them to inform the cognizant area RMC that on-site support is required.

2.4.3.2 On-Site Support. In a port without a RMC or underway, if Distance Support is determined unsuccessful by the RMC, the Operational Commander or TYCOM will determine whether the cognizant Area RMC will transition to on-site assistance. In a port with a RMC, the RMC may determine transition to on-site support, as prioritized by guidance in paragraph 2.7.4.1 of this chapter**.**

2.5 COMPLETION.

NOTE: THERE WILL BE OCCASIONS WHEN AN UNDERWAY SHIP MAY NOT REQUIRE ALL SYSTEMS TO BE FULLY OPERATIONAL. SUCH SYSTEM DEFICIENCIES MAY BE THE SUBJECT OF A CASREP OR THEY MAY ONLY BE DOCUMENTED IN THE SHIP'S CURRENT SHIP'S MAINTENANCE PROJECT.

2.5.1 Fleet Technical Assistance Completion. To complete the FTA the ship must concur that the cognizant RMC has completed one of the following:

a. The fault is resolved.

b. Parts identified to resolve the fault.

c. Original fault troubleshooting is complete and the deficiency is identified (i.e., Ship understands what needs to be repaired).

2.5.2 Transition to Repair. A completed FTA may require a subsequent deferral (TA-1, TA-2) for repair activity action or Ship's Force corrective maintenance (TA-4).

2.6 RESPONSIBILITIES.

2.6.1 Ship's Commanding Officer. Ship's Commanding Officer will:

a. Ensure all FTA requests are accurate, complete and timely.

b. Ensure all FTA requests reference a JCN and contain a detailed problem description in accordance with paragraph 2.4.2 of this chapter to enable technical assistance personnel to adequately research the problem and provide timely and accurate technical assistance. Ensure the 2-kilo is up-lined.

c. For FTA requests associated with systems that are not required to meet current/projected mission tasking, ensure associated CASREP and/or 2-Kilo address whether or not on-site assistance will be required if Distance Support is unable to resolve the issue.

d. Ensure that TYCOM, Immediate Superior In Command (ISIC) and Operational Commander are kept informed of technical issues and technical assistance requests in accordance with existing guidance.

e. While a ship is underway or in another port without a RMC, ensure Distance Support alternatives are exhausted before on-site technical assistance is requested. This policy is in place to ensure satisfactory crew and technical assistance personnel Distance Support procedure training and proficiency so they are able to efficiently use Distance Support when the ship is deployed.

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

g. Immediately upon completion of an on-site visit, the Fleet unit will release the FTA personnel. When redirection of the same personnel to other problems is desired, the Fleet unit will coordinate with the cognizant Area RMC.

h. Ships will establish a central, secure E-mail account that will be available to all appropriately cleared technical assistance personnel who 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 RMCTECHASSIST@Ship.navy.smil.mil where "Ship" is the name of the vessel.

i. Ship will issue arrival/departure message keeping all apprised of technical representative movement.

2.6.2 Regional Maintenance Center Commanders. RMC Commanders will ensure:

a. Sufficient capability exists to provide timely response to all requests for technical assistance, either with RMC personnel or other sources of support. The RMC is responsible for coordinating the response from other sources of support as detailed in paragraph 2.6.3 of this chapter.

b. RMC mission funds are used to fund all FTA efforts in accordance with paragraph 2.7.4 of this chapter.

c. Technical support is provided to Fleet units in accordance with this directive. In the event there is a work priority conflict, the Area RMC will coordinate resolution with the appropriate TYCOM, Operational Commander or Fleet Maintenance Officer Staff, as necessary.

d. The initial response to FTA requests is via Distance Support whether in port or at-sea. The use of Distance Support while the ship is in a port with a RMC is encouraged, although not required. It is a tool that can be utilized by the RMC in order to prioritize work assignments and service a wider customer base. On-site support while a ship is in a port with a RMC can allow for quicker identification of the problem and training of Ship's Force technicians. If Distance Support is unsuccessful, the cognizant Area RMC will determine if on-site assistance is appropriate, based on guidance in paragraph 2.7.4.1 of this chapter. If appropriate, the Area RMC will provide on-site FTA from RMC resources or coordinate provision of on-site support from other government/contractor organizations as discussed in paragraph 2.6.3 of this chapter.

e. Personnel responding to a 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 onboard maintenance training to Ship's Force personnel. Troubleshooting shall be conducted in accordance with Volume V, Part I, Chapter 2, paragraph 2.4 of this manual.

f. Acknowledgment and response to all FTA requests within 24 hours, via phone conversation, e-mail or Naval Message.

g. 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.

h. A message Technical Assistance Visit Report (TAVR) (Naval), in the format provided in Appendix B, is required at the completion of an on-site FTA anytime one or more of the following criteria are met:

(1) Personnel or Equipment safety issue.

(2) Submarine FTA.

i. An E-mail TAVR (E-TAVR), in the format provided in Appendix C, is required at the completion of an on-site FTA on Surface Force Ships/Carriers anytime one or more of the following criteria are met:

(1) C3/C4 CASREP.

(2) Repetitive system/equipment failure and/or long term improvement recommendations.

(3) FTA responsibility passed to another RMC or other Source of Support.

(4) Loss of mission capabilities. (e.g., AAW, MOB, ASW).

(5) Significant follow-on repair recommendations.

(6) High visibility.

j. Task other Source of Support provider who responds to an on-site FTA, coordinated by his/her RMC, to submit a TAVR as required by paragraph 2.6.3.e of this chapter or task them to provide the technical information necessary for the cognizant RMC to generate a TAVR**.**

k**.** Submission of a message report if an on-site assist visit is terminated. Technicians who are not adequately supported by Ship's Force personnel shall immediately notify the ISIC/TYCOM. If the lack of support by Ship's Force personnel cannot be resolved, then the technicians are authorized to depart the ship and terminate the visit. Termination of the ship visit under these circumstances will be detailed in a follow-up message to the appropriate TYCOM/ISIC with information to the appropriate Fleet Commander (N43).

2.6.3 Other Source of Support Providers. Other source of support providers include any non-Area RMC activity that responds to a technical assistance request. Examples of other source of support providers include: Naval Warfare Center, Original Equipment Manufacturer, commercial repair firms, Systems Command, non-RMC Naval Shipyard, Propulsion Plant Engineering Activity, etc. Other source of support providers will:

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

b. First, use Distance Support to resolve the problem. Provide the tasking Area RMC with timely Distance Support status and results.

c. Coordinate with the tasking Area RMC 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 onboard maintenance training to Ship's Force personnel.

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. At the completion of on-site technical assistance, comply with administrative requirements addressed in paragraph 2.8 of this chapter within 5 working days of the visit completion.

2.6.4 Navy Global Distance Support Center Fleet Technical Assistance Request Processing Procedure. Initial FTA requests received by the NGDSC will be recorded by a Customer Service Representative. The Customer Service Representative must ensure the request is sent to the cognizant Area RMC (if different from the homeport RMC) and notify the cognizant area RMC. This will enable the cognizant Area RMC to commence immediate action on the FTA request.

2.7 REGIONAL MAINTENANCE CENTERS.

2.7.1 Regional Maintenance Centers. RMCs will serve as the primary source of Fleet Technical Assistance. For purposes of this specific FTA policy, use of the term "RMC" includes Regional Support Group New London and TRIDENT Refit Facility Kings Bay since these two activities will be serving as "Area RMCs" in providing FTA as noted in Table 2-1 of this chapter.

2.7.2 Area Regional Maintenance Center Area of Responsibility Assignments. Area RMC Area of Responsibility (AOR) assignments are listed in Table 2-1 below. Figure 2-1 graphically supplements Table 2-1 in depicting the AOR for each RMC. The AOR in which a ship is operating at the time an FTA request is initiated will dictate which Area RMC is responsible for coordinating/providing that FTA (becomes the "cognizant Area RMC"). If a ship is located in an AOR other than their homeport AOR, and the ship initiates a routine FTA request (one that does not require the cognizant Area RMC to expend travel or overtime funds for on-site support in the event Distance Support is unsuccessful), the homeport Area RMC will assume cognizance of that FTA request and accomplish it as a routine priority via Distance Support or, if necessary, via on-site FTA when the ship returns to homeport.

AREA RMC	AREA OF RESPONSIBILITY (AOR)
Southwest RMC (SWRMC), San Diego, CA	Ships, SSNs, aircraft carriers and craft in port or operating off the U.S. West Coast from the San Francisco Bay area south to the southern point of South America and selected mine warfare systems worldwide.
Puget Sound Naval Shipyard & Intermediate Maintenance Facility (IMF), Bremerton, WA	Ships, SSNs, aircraft carriers and craft in port or operating in the PACNORWEST area from North of San Francisco, CA, to northern Pacific/Alaska area and all SSBN/SSGN units in PACFLT.
Pearl Harbor Naval Shipyard & IMF, Pearl Harbor, HI	Ships, aircraft carriers, craft and SSN 688 and SSN 774 Class submarines in port or operating in the MIDPAC area and all non-SSBN/SSGN submarines (excluding SSN 21 Class) and submarine tenders operating in the Seventh Fleet AOR.
Ship Repair Facility (SRF) and Japan Regional Maintenance Center (JRMC), Yokosuka, Japan	Ships, aircraft carriers and craft in port or operating in the Seventh Fleet AOR.
Norfolk Ship Support Activity (NSSA), Norfolk, VA	Ships, aircraft carriers and craft in port or operating in the Atlantic Ocean from Charleston, SC, latitude northward. Submarines* in port and all SSN 688 and SSN 774 Class submarines operating in the Atlantic Ocean to the southern tip of South America excluding those in port or operating in New London/Groton, CT regional waters.
NSSA Det Naples, Italy	Ships, aircraft carriers, craft and SSN 688 and SSN 774 Class submarines* in port or operating in the Sixth Fleet AOR.
NSSA Det. Bahrain	Ships, aircraft carriers, craft and SSN 688 and SSN 774 Class submarines* in port or operating in the Fifth Fleet AOR.
Regional Support Group/Submarine Technical Support Center (STSC) Groton, CT	SSN 688 and SSN 774 Class submarines* in port or operating in the Groton/New London, CT regional waters.
TRIDENT Refit Facility, Kings Bay, GA	All Atlantic Fleet SSBN/SSGN units.
SERMC, Mayport, FL	Ships, aircraft carriers and craft in port or operating south of the Charleston, SC latitude in the Atlantic Ocean to the southern tip of South America.

* Puget Sound Naval Shipyard & Intermediate Maintenance Facility has responsibility for all SSN 21 Class submarines regardless of location.

Table 2-1 RMC Area of Responsibility Assignments

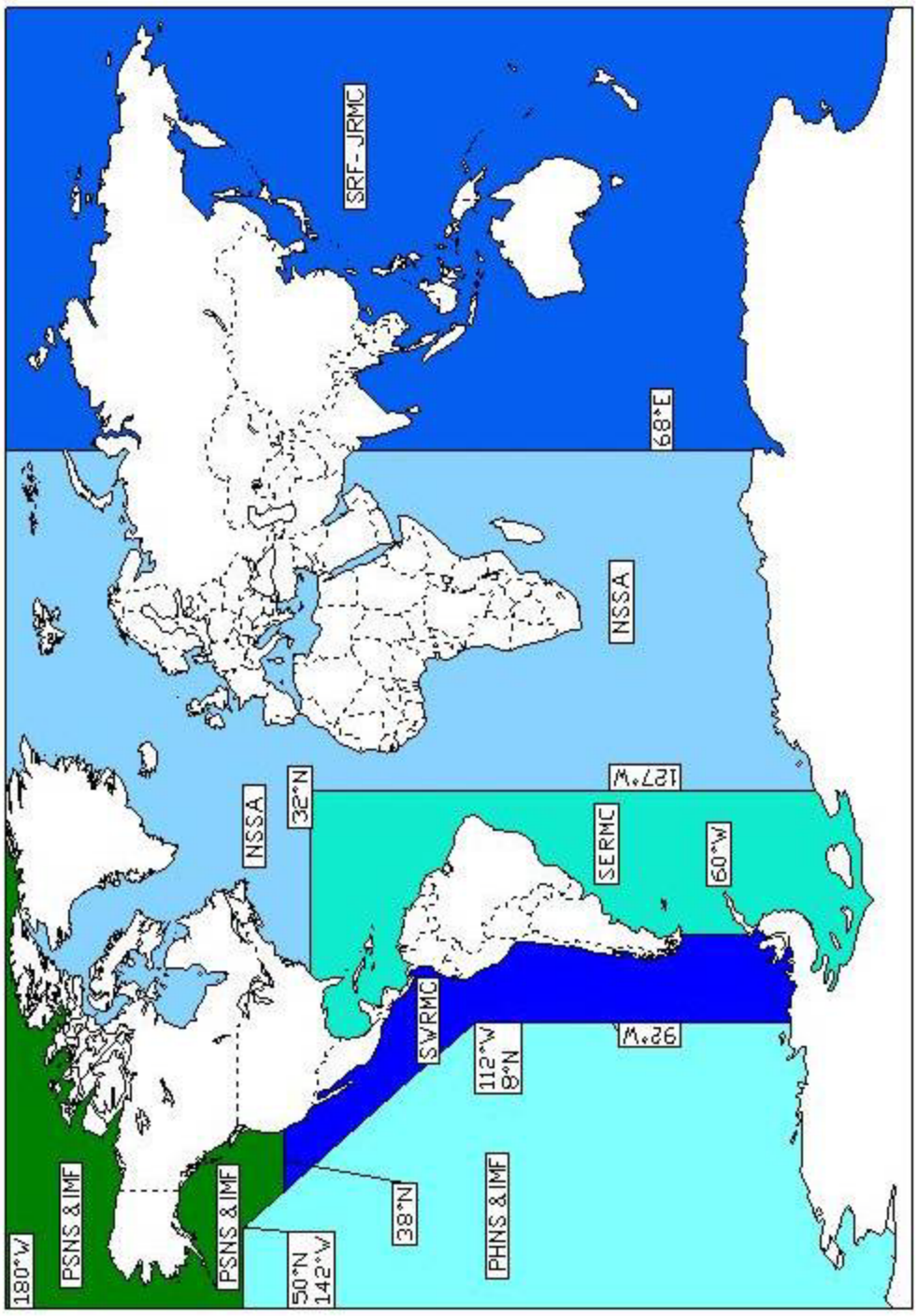

Figure 2-1 RMC Area of Responsibility

2.7.3 Considerations for Providing Assistance.

2.7.3.1 Distance Support. Costs to provide FTA can be dramatically reduced using Distance Support especially when a ship is underway or is not in a port with a RMC. Distance Support may include various forms of two-way communication such as telephone, email, web "chat", streaming video, etc. Additionally, its use has facilitated more effective use of limited technical resources to service a larger number of customers more efficiently. Normally, the cognizant Area RMC will have a subject matter expert available to respond to FTA requests via Distance Support, but in the event that such an expert is not readily available, the cognizant Area RMC is encouraged to contact another Area RMC to enlist their assistance in providing such Distance Support. In support of the Chief of Naval Operation's guidance to shift away from a risk averse culture in the Navy, not all FTA requests will be responded to with on-site support. However, the Operational Commander or TYCOM may direct immediate on-site support, if warranted.

2.7.3.2 On-Site Support. If the use of on-site support is warranted, the cognizant Area RMC will provide or obtain personnel to affect on-site assistance. The cognizant Area RMC will take into account the ship's operational schedule, as well as ship, ISIC, Operational Commander and TYCOM requirements, when determining if and at what point to shift from Distance Support to on-site support. Paragraph 2.7.4.1 of this chapter provides additional specific guidance regarding when on-site support will be provided and the prioritization of such responses should there be multiple requirements for the same FTA support personnel.

2.7.3.3 Fleet Technical Assistance Support Transfer and Acceptance. The cognizant Area RMC is responsible for providing or obtaining FTA support and is responsible for its completion. If the cognizant area RMC has neither the capability nor capacity to provide the FTA support required, the cognizant RMC will request FTA support from another source of support.

2.7.3.4 Transferring Regional Maintenance Center. The RMC transferring the FTA will transmit a TAVR via appropriately classified email or Naval message, using the samples provided as Appendix B or C of this chapter, synopsizing actions taken to date on the FTA after reaching agreement with another source of support to accept responsibility for the FTA. The accepting source of support and new Point of Contact information will be identified in the TAVR. For Surface Ships and Carriers, the transferring RMC will document all time and actions taken and will pass the task to the accepting source of support in approved FTA software. For submarines, the ship’s homeport will broker the 2-kilo to the accepting source of support.

2.7.3.5 Accepting Source of Support. The accepting source of support for the FTA assumes responsibility to provide the necessary support to resolve the FTA. If the source of support cannot resolve the FTA, they shall request the cognizant Area RMC obtain the necessary support to resolve the FTA. The accepting source of support will also document all time and actions taken related to the FTA, and inform the cognizant Area RMC on the status of the FTA.

2.7.3.6 Support Coordination. If another source of support is required, close coordination should be maintained between the supporting activity providing such assistance and the cognizant Area RMC to ensure the highest level of responsiveness is being provided. Assistance from another Area RMC does not abrogate the cognizant Area RMC's responsibility to ensure completion of the FTA request and the cognizant Area RMC retains full responsibilities as outlined in this manual.

2.7.4 Funding.

a. Expenditure of funds for on-site FTAs has been significantly reduced by increased use of Distance Support. The source selection to provide on-site FTA must consider overall resource availability balanced against criticality of need, but in order to minimize cost, resources to meet on-site FTA needs should be considered in the following priority order:

(1) cognizant Area RMC personnel.

(2) other Area RMC personnel.

(3) other government resources.

(4) private sector.

b. If personnel from another Area RMC are used to support the FTA requirement, the Area RMC providing the personnel will pay all costs for those personnel including base salary, overtime, travel and per diem. For all other sources of support, the cognizant Area RMC will pay all costs for providing the on-site support. Area RMCs will notify the Fleets if their total FTA related expenditures in support of ships home ported in other RMC locations become significant. The Fleets will review these submissions and determine if funds transfer(s) are required to ensure RMC mission completion.

NOTE 1: IN ACCORDANCE WITH REFERENCE (a), FORWARD DEPLOYED NAVAL FORCES UNDER C7F CONTINUOUSLY OPERATE WITHIN THE INTEGRATED/ SUSTAINMENT PHASE OF THE SEVENTH FLEET TRAINING PLAN IN SUPPORT OF REFERENCE (b) UNLESS IN A CNO AVAILABILITY.

NOTE 2: IF U.S. COAST GUARD OR FOREIGN NAVY VESSELS ARE PART OF A CARRIER STRIKE GROUP OR EXPEDITIONARY STRIKE GROUP, EITHER IN WORK-UP PHASE OR DEPLOYMENT, THEY WILL RECEIVE FTA SUPPORT PRIORITIZATION AS THOUGH THEY WERE UNITED STATES NAVY SHIPS (PRIORITIES 1-7 APPLY). REIMBURSEMENT FOR ALL COSTS TO PROVIDE SUCH FTA SERVICES WILL BE IN ACCORDANCE WITH THE MEMORANDUM OF AGREEMENT/MEMORANDUM OF UNDERSTANDING THAT IS NORMALLY SIGNED BETWEEN THE SERVICES/GOVERNMENTS WHEN SUCH JOINT OPERATIONAL ARRANGEMENTS EXIST.

2.7.4.1 On-Site Support. If Distance Support is unsuccessful or if the nature of the FTA request warrants immediate transition to on-site support, the cognizant Area RMC will coordinate and provide such on-site support as prioritized below:

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

Priority 2 - Services to deployed ships. If resource constrained when there are multiple requirements to provide on-site support to deployed ships, prioritization of response will be:

(1) SSBN FTAs;

(2) FTAs associated with a CASREP as determined by the TYCOM;

(3) Other FTA requirements as determined by the Operational Commander and TYCOM.

Priority 3 - Services to ships that are classified as within the pre-deployment or post-deployment part of the Sustainment Phase of reference (b). If resource constrained when there are multiple requirements to provide on-site support, prioritization of response will be:

(1) SSBN FTAs;

(2) FTAs associated with a CASREP as determined by the TYCOM;

(3) Other FTA requirements as determined by the Operational Commander and TYCOM.

Priority 4 - Services to ships that are classified as within the Integrated phase of reference (b), or ship's that are classified as Independent Unit Ready for Tasking. If resource constrained when there are multiple requirements to provide on-site support, prioritization of response will be:

(1) SSBN FTAs;

(2) FTAs associated with a CASREP as determined by the TYCOM;

(3) Other FTA requirements as determined by the Operational Commander and TYCOM.

Priority 5 - Services to ships that are classified as within the Basic phase of reference (b). If resource constrained when there are multiple requirements to provide on-site support, prioritization of response will be:

(1) SSBN FTAs;

(2) FTAs associated with a CASREP as determined by the TYCOM;

(3) Other FTA requirements as determined by the Operational Commander and TYCOM.

Priority 6 - Other U.S. Navy FTA requests not addressed in one of the above priorities (e.g., FTA support during Chief of Naval Operations availabilities addressed in paragraph 2.4.3 of this chapter).

Priority 7 - Technical assistance requests from non-Navy organizations (e.g., Coast Guard, U.S. Army, U.S. Air Force, Foreign Military Sales, etc.).

2.8. Post-Fleet Technical Assistance Administrative Requirements.

a. At the conclusion of an on-site technical assistance visit, the cognizant Area RMC representative(s) will assist the ship in completing the 2-Kilo and provide a final debrief to the ship's cognizant Department Head, or his/her designated representative, prior to departing the ship. Information collected for the FTA shall be uploaded to 3M history.

b. A TAVR is required at the completion of on-site FTA visits as addressed in paragraph 2.5.2.h and 2.5.2.k of this chapter. TAVRs should be submitted within 5 working days of visit completion.

APPENDIX A

AREA REGIONAL MAINTENANCE CENTER FLEET TECHNICAL ASSISTANCE CONTACT INFORMATION

AREA RMC	COVERAGE HOURS	PHONE	E-mail/Message PLADs
Norfolk Ship Support Activity (NSSA) Norfolk, VA	24/7/365	Comm: 757-443-3872 Secure: 757-443-3872, ext 2451 CDO: 757-443-3663	NIPRNET: marmc_tsdo@navy.mil SIPRNET: nssa_sipr_tsdo@navy.smil.mil MSG PLAD: SHIPSUPPACT NORFOLK VA
Norfolk Ship Support Activity Detachment Naples, Italy (NSSA DET NAPLES)	0600-1800 WEEKDAYS 0800-1200 WEEKENDS & HOLIDAYS CDO after hours	Comm: 011-39-081-568-7849 DSN: 314-626-7849 Fax: 011-39-081-568-7866 CDO: 39-335-725-1657	NIPRNET: NSSADETNAPLESCDO@EU.NAVY.MIL SIPRNET: NSSADET NAPLESCDO@EU.NAVY.SMIL.M**IL** MSG PLAD: SHIPSUPPACT NORFOLK DET NAPLES IT//00NA//
Regional Support Group Groton/Submarine Technical Support Center (STSC) Groton, CT	0700-1630 WEEKDAYS CDO after hours	Comm: 860-694-7872 Admin: 860-694-4714 DSN: 694-7872/4714 STSC groton CDO after hours: 860-625-3230	MSG PLAD: COMREGSUPPGRU STSC GROTON CT
NSSA Detachment Bahrain	Hours: 0730-1600 Sunday-Thursday (TD available after normal hours)	Comm: 011-973-17-853-777 DSN: 318-439-3777 TD: 011-973-3-945-9128 Fax: 011-973-17-854-447	NIPRNET: SIPRNET: SRUOIC@nsabahrain.navy.smil.mil MSG PLAD: SHIPSUPPACT NORFOLK DET BAHRAIN

AREA RMC	COVERAGE HOURS	PHONE	E-mail/Message PLADs
Puget Sound Naval Shipyard & IMF (North West Regional Maintenance Center) (NWRMC) Bremerton, WA	0630-1500 WEEKDAYS CDO - 24/7	425-304-5449 DSN: 727-5449 CDO: 425-870-0042 Everett 360-340-0106 Bremerton	NIPRNET: techassistnw@navy.mil MSG PLAD: NAVSHIPYD AND IMF PUGET SOUND WA//210/290//
Pearl Harbor Naval Shipyard and IMF Hawaii Regional Maintenance Center (HRMC) Pearl Harbor, HI	24/7/365	Comm: 808-630-7762 DSN: 315-473-0129 Code 210 DO: 808-630-7762	NIPRNET: hrmc.techassist@navy.mil SIPRNET: hrmc.techassist@navy.smil.mil MSG PLAD: NAVSHIPYD AND IMF PEARL HARBOR HI//101/200/210//
Ship Repair Facility (SRF) and Japan Regional Maintenance Center (JRMC) Yokosuka, Japan	0730-1630 Mon-Fri CDO after hours	DSN: 315-243-5362 CDO DSN: 315-243-5488 CDO Cell: 81-90-1851-8817	NIPRNET: TECHASSIST_JRMC@srf.navy.mil SIPRNET: TECHASSIST_JRMC@fe.navy.smil.mil MSG PLAD: NAVSHIPREPFAC AND JAPAN RMC YOKOSUKA JA
Southeast Regional Maintenance Center (SERMC) Mayport, FL	Call CDO. If no CDO contact, call Quarterdeck.	CDO: 904-591-8008 Quarterdeck: 904-270-5126 DSN: 960-XXX-XXXX	NIPRNET**:** sermc-cdo.fct@navy.mil MSG PLAD: SOUTHEAST RMC MAYPORT FL

AREA RMC	COVERAGE HOURS	PHONE	E-mail/Message PLADs
South West Regional Maintenance Center (SWRMC) San Diego, CA	24/7/365	DSOC: 619-556-3608 DSN: 526-3608 Secure: 619-556-8710 CDO CELL: 619-921-6249	NIPRNET: swrmctechassist@navy.mil SIPRNET: swrmctechassist.fct@navy.smil.mil MSG PLAD: SOUTHWEST RMC SAN DIEGO CA
Trident Refit Facility (TRF) Kings Bay, GA	24/7/365	CDO: 912-674-3125	NIPRNET: cdo.trfkb@navy.mil MSG PLAD: TRIREFFAC KINGS BAY GA

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APPENDIX B

SAMPLE TECHNICAL ASSISTANCE VISIT REPORT (TAVR) MESSAGE

FROM ON-SITE FTA PERFORMING ACTIVITY// (Could be RMC, NSY, NWC, etc.)
TO: SHIP REQUESTING ASSISTANCE
ADDITIONAL ACTION ADDRESSEES (AS APPROPRIATE, TO INCLUDE ACCEPTING RMC FOR FTA TRANSFERS)
INFO: COMUSFLTFORCOM NORFOLK VA// (AS APPROPRIATE)
COMPACFLT PEARL HARBOR HI// (AS APPROPRIATE)
NUMBERED FLEET COMMANDER
TYCOM
GROUP
SQUADRON
COMNAVSEASYSCOM WASHINGTON DC//(PROGRAM MANAGER)//
ISEA/PROGRAM MANAGER//
COMSPAWARSYSCOM SAN DIEGO CA// (FOR ASSISTS ON C4I)
OTHER REGIONAL MAINTENANCE CENTER (AS APPROPRIATE)
RMC DET (AS APPROPRIATE)
NSWC CORONA CA// (FOR ASSISTS ON C4I/COMBAT SYSTEM)
COMNAVSAFECEN NORFOLK VA// (SAFETY RELATED ITEMS ONLY)
NETC PENSACOLA FL// (TRAINING ISSUES ONLY)
SERVSCOLCOM GREAT LAKES IL// (TRAINING ISSUES ONLY)
FLEASWTRACEN SAN DIEGO CA// (ASW TRAINING ISSUES ONLY)
FCTCLANT DAM NECK VA// (FOR ASSISTS ON C4I/COMBAT SYSTEM)
SWRMC// (FOR PACFLT SSN ONLY)
NAVSUBSCOL GROTON CT// (FOR SUBMARINES ONLY)
TRITRAFAC KINGS BAY GA// (FOR SSBN/SSGN SUBMARINES)
NWRMC// (FOR SSBN/SSGN SUBMARINES)
OTHERS (AS APPROPRIATE)
BT
UNCLAS //N0XXXX//
MSGID/GENADMIN/RMC 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, RMCXXXX 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. (STATE WHY DISTANCE SUPPORT WAS UNABLE TO RESOLVE THIS ISSUE. IF THIS TAVR IS TO DOCUMENT AN FTA TRANSFER, SO STATE AND INCLUDE FTA ACCEPTING RMC COMMAND TITLE AND SPECIFIC POC INFO.).
   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.

5. RECOMMENDATIONS:
   A. FOR USS XXXXX:
      (1) IDENTIFY FOLLOW-ON ACTION.
      (2) ABOVE DISCUSSED WITH (NAME) PRIOR TO DEPARTING SHIP.
   B. FOR TYCOM/RMC:
      (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. WERE ADEQUATE MATERIALS/SPARE PARTS AVAILABLE TO SHIP'S FORCE TO CORRECT THE PROBLEM?
   D. WAS SHIP'S FORCE LEVEL OF KNOWLEDGE ADEQUATE TO CORRECT THE PROBLEM?
BT

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

APPENDIX C

SAMPLE E-MAIL TECHNICAL ASSISTANCE VISIT REPORT (E-TAVR)

E-mail TAVR distribution will include the following:
TO: SHIP REQUESTING ASSISTANCE (C.O., X.O., DEPT HEADS)
ADDITIONAL ACTION ADDRESSEES (AS APPROPRIATE, TO INCLUDE ACCEPTING RMC FOR FTA TRANSFERS)
CC:
U.S. FLEET FORCES COMMAND N43
COMMANDER U.S. PACIFIC FLEET N43
FLEET COMMANDERS: (as appropriate)
TYPE COMMANDERS: (as appropriate)
NAVSEA/SPAWAR PROGRAM MANAGERS: (as appropriate)
NSWC/SSC IN-SERVICE ENGINEERING AGENTS: (as appropriate)
RMCS: (as appropriate)
TRAINING COMMANDS: (TRAINING ISSUES ONLY, as appropriate)
NAVAL SURFACE WARFARE CENTER CORONA (QA33)

Email TAVR format will be as follows:

SUBJ/USS XXX (HULL) EQUIPMENT NAME TECH ASSIST VISIT REPORT// (Insert brief equipment description; for ex. T 1348 Transmitter)
REF/A/CASREP/DTG//(Reference Designation, change as necessary/Change as necessary/Date Time Group of reference)
REF/B/DOC/2-KILO//
REF/C/TEL/TELCON INFO//
NARR/REF A IS XXXXXXX. REF B IS XXXXXX. REF C IS XXXXXX.// (Summary of Tech Assist request. For ex., REF A is CASREP Initial 04003 request for tech assist)
POC/NAME/GRADE-RATE/TEL:DSN /TEL: // (Identify RMC Technician/RMC Technician Grade/Rank. For ex., GS-12 or E7 / RMC Technician DSN/extention/RMC Technician Comm/extention)
1. BACKGROUND: REF A REPORTED (Problem). AS REQUESTED REF A, RMCXXXC REP, (Name) PROVIDED TECH ASSIST (Date) AT (Location) TO ASSIST WITH CORRECTION OF THE PROBLEM. REF B IS THE APPLICABLE TECH MANUAL.
2. FINDINGS/CORRECTIVE ACTION:
    A. BRIEF PROBLEM STATEMENT.
    B. SUMMARIZE FINDINGS AND CORRECTIVE ACTIONS. (State why distance support was unable to resolve problem. If this TAVR is to document an FTA transfer, so state and include FTA accepting RMC command title and specific poc info.).
3. CONCLUSION:
    A. STATEMENT ON CAUSE OF PROBLEM/ROOT CAUSE.
    B. SOMETIMES CONVENIENT TO COMBINE WITH FINDINGS.
4. LEVEL OF SF SUPPORT:
    A. ABOVE AVERAGE/AVERAGE/BELOW AVERAGE
    B. NUMBER OF SHIPS FORCE PERSONNEL TRAINED DURING VISIT
5. RECOMMENDATIONS:
    A. FOR USS XXXX:
        (1) IDENTIFY FOLLOW-ON ACTION
        (2) ABOVE DISCUSSED WITH (Name) PRIOR TO DEPARTING SHIP
    B. FOR TYCOM/RMC:
        (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 THE 2-KILO PROVIDED TO SHIP DURING DEBRIEF. JCN _____ APPLIES.

7. A. MANHOURS EXPENDED FOR TECH ASSIST.
   B. MANHOURS EXPENDED FOR TRAINING.

8. EVALUATION OF NECESSITY FOR TECHNICAL ASSISTANCE:
   A. WAS ADEQUATE TECHNICAL DOCUMENTATION AVAILABLE TO SHIP'S FORCE TO CORRECT THE PROBLEM?
   B. WERE ADEQUATE TOOLS AVAILABLE TO SHIP'S FORCE TO CORRECT THE PROBLEM?
   C. WERE 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?

VOLUME VI

CHAPTER 3

SUBMARINE 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 SL720-AA-MAN-030 - Navy Modernization Process Management and Operations Manual (NMP-MOM)
(g) NAVSEA T9044-AD-MAN-010 - Requirements Manual for Submarine Fly-By-Wire Ship Control Systems
(h) NAVSEAINST 4790.8/OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(i) NAVSEA 0989-LP-037-2000 - Commissioned Submarine 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 4720.3 - Management of Afloat Combat Systems and C41 Installations and Improvements

LISTING OF APPENDICES.

A Major Ship Alteration Types Executive Summary
B Submarine Alteration Request Format
C RPCCR Forwarding Letter Format
D Sample TEMPALT/OPALT Reporting Message
E TYKIT Requisition Form
F Sample Alteration Feedback Message
G TYCOM Alteration Management System Interpretation Guide

3.1 PURPOSE. To establish procedures, policy and responsibilities for the management and execution of the Submarine 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, Machinery Alterations (MACHALT), Type Zero (TZ) Improvements, Engineering Changes, Field Changes (FC), Ordnance Alterations (ORDALT), 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 Regional Maintenance Automated Information System (RMAIS)/Logistics Data System (LDS) 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. Within two days of receipt, the MDCO will input the original OPNAV 4790/CK and Section I of the RPCCR into the on-site RMAIS/LDS computer. MDCO/TYCOM will stamp all documents "ADP PROCESSED" to verify RMAIS/LDS reporting.

k. (Nuclear Powered Vessels only) 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, Part I, Chapter 4 of this manual.)

t. 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. 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. 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. 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, a TYCOM Alteration Management (TAMS) Report, a Non-Nuclear Title "K" SHIPALT Report (available from TYCOM), and a Nuclear Alteration (NUCALT) Technical Documentation Compact Disk (CD).

z. Preparing and forwarding TAMS/Fleet Modernization Program Management Information System reports to individual units a minimum of once per quarter.

aa. Ensuring all Fly-By-Wire Ship Control System alterations are in accordance with reference (g).

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

a. 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 (h) 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 for entry into RMAIS/LDS and then forwarded to the ship for follow-up.

f. (Nuclear Powered Vessels only) Upon completion of each reactor plant alteration, prepare an RPCCR using the procedures outlined in references (i) and (j). Prior to forwarding the RPCCR to Ship's Force, forward it to MDCO for entry into RMAIS/LDS. 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 consisting of a TAMS Report, a Non-Nuclear Title "K" SHIPALT Report (available from TYCOM), and a NUCALT Technical Documentation CD report, alteration briefs, alteration software and related documentation.

h. Maintaining a current status of alterations.

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. Requisitioning authorized and RFI TYKITs using Appendix E of this chapter.

m. 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. Providing for proper stowage of TYKITs and other alteration material.

o. 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 in accordance with reference (h) three days prior to end of upkeep.

f. Ensuring that all RPCCRs provided by the installing activity are expeditiously completed in accordance with references (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 (h).

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, Part I, Chapter 4 of this manual.)

j. 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 the TAMS Report, a Non-Nuclear Title "K" SHIPALT Report (available from TYCOM), and a NUCALT Technical Documentation CD report and reporting any discrepancies to the ISIC/TYCOM.

o. 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.

q. Ensuring all Fly-By-Wire Ship Control System alterations are in accordance with reference (g).

r. Following installation of an alteration that modifies the structure of the Ship, such that access to vital equipment is or may be impacted, the Ship shall evaluate the need to perform Unrestricted Operation (URO)-29. If access to vital equipment could be restricted, the Ship shall perform URO-29 and provide a copy to the installing activity and the ISIC. Partial accomplishment of URO-29 is acceptable if appropriate for the alteration.

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) and (k). 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 OF THIS CHAPTER ARE NOT PROVIDED BY THE AIT, REPORT THE MISSING ITEMS IN THE COMPLETION REPORT, WITH A COPY TO THE TYCOM FMP MANAGER.

3.3.3 Type Commander Alteration Kit Program. 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. 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 G of this chapter provides a TAMS Interpretation Guide.

3.4.2 Navy Data Environment - Navy Modernization. The official automated system supporting the information and decision support requirements of FMP managers Navy wide. The Navy Data Environment - Navy Modernization 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 Navy Data Environment - Navy Modernization database is the authoritative planning baseline for FMP operation throughout the Navy FMP community.

3.4.3 Nuclear Alteration Technical Documentation Compact Disk. The NUCALT Technical Documentation CD provides information required to accomplish nuclear SHIPALTs and A&I items. It is issued to applicable ships, ISICs and FMAs quarterly. It provides information on all outstanding nuclear alterations applicable to each 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 (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 (h).

3.6 ALTERATION REQUESTS. Requests for new alterations should be made using the format provided in Appendix B. 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 (i).

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 reference (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
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	Requires Industrial Activity/FMA, or Ship's Force expertise. Can require CPM (3).	Fleet Commander/TYCOM
Title F SHIPALT	Less complex; requires FMA/Ship's Force expertise. Cannot require CPM.	Fleet Commander/TYCOM
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 Field Changes (FC)	Approved minor changes to NAVSEA 06 combat systems equipment.	FMP (ORDALTs)
NAVSEA Command and Control Systems (CS/CCS) Engineering Change (EC)	Approved minor changes to selected NAVSEA CS/CCS equipment.	FMP (ORDALTs)
Space and Naval Warfare Systems Command (SPAWAR) Field Changes (FC)	Approved minor changes to SPAWAR electronic equipment.	FMP (SPAWAR FCs)
Alteration & Improvement (A&I)	Tests, inspections and minor alterations to submarines and submarine tenders; no significant ILS impact.	Fleet Commander/TYCOM
TZ Improvements	Minor alterations to SSBN/SSGN 726 Class submarines; no significant ILS impact.	Fleet Commander/TYCOM
TYCOM Discretionary Changes (TDC)	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 (TCMOD)	Alterations on the TRIDENT Command and Control System.	NAVSEA
Temporary Engineering Changes (TEC)	Emergent temporary modification to the TRIDENT Command and Control System.	NAVSEA
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

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APPENDIX B

SUBMARINE 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) COMUSFLTFORCOMINST 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:

ISIC ENDORSEMENT OF SUBMARINE 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 (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)

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) COMUSFLTFORCOMINST 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)

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)

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) COMUSFLTFORCOMINST 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)

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
EBDIV/NNS (as applicable)
NAVICP Mechanicsburg (Code 87)

Copy to:
(Ship)
(Installing Activity)

APPENDIX D

SAMPLE TEMPALT/OPALT REPORTING MESSAGE

FM (INSTALLING ACTIVITY)//
TO COMNAVSEASYSCOM WASHINGTON DC// (SSN/SSBN/SSGN)//
TYCOM// (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 CURRENT MESSAGE FORMAT AND CURRENT PLAIN LANGUAGE ADDRESS DIRECTORY (PLAD) IS UTILIZED.

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APPENDIX E

TYKIT REQUISITION FORM

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:

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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 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 CURRENT MESSAGE FORMAT AND CURRENT PLAD IS UTILIZED.

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APPENDIX G

TYCOM ALTERATION MANAGEMENT SYSTEM INTERPRETATION GUIDE

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)
SSGN	G	Nuclear-Powered Guided Missile Submarine
AS	A	Submarine Tender
AGSS	G	Deep Submergence Ship
SRC	P	Submarine Rescue Chamber
SSN	Q	Reactor Plant Modifications
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 (*denotes 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/Submarine Flight Critical Component Boundary work requirements and document SUBSAFE/REC or Submarine Flight Critical Component CWP 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
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
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
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.

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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 - Shipboard Systems Certification Requirements for Surface Ship Industrial Periods (Non-Nuclear)
(g) COMNAVSEASYSCOM WASHINGTON DC 031440Z MAR 03 - Submarine Industrial EMC and EMI Control Interim Guidance
(h) N6-NTSP-S-70-8003 - Navy Training System Plan (NTSP) for Electromagnetic Interference (EMI) Control
(i) 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) or the Shipboard Electromagnetic Compatibility Improvement Program (SEMCIP) program in the U.S. surface force, aircraft carrier and submarine fleets.

4.1.1 Background. The 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 Strike 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 force ships and aircraft carriers will receive an EMC assessment from Regional Maintenance Center (RMC) 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 RMC or by submitting an OPNAV 4790/2K to their Regional Support Group (RSG)/RMC. 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 force ship and aircraft carrier 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 Force Ships and Aircraft Carriers. 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 or Frequency-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. Where transmission lines and antennas are coupled and cannot be easily separated, reconnected and weather-proofed, testing of transmission line/antenna combinations may be performed via Time-Domain Reflectometer/Frequency-Domain Reflectometer, satisfying the testing requirements of this paragraph and paragraph 4.2.1.1g.

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 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 references (b) and (c) by qualified NAVSEA or NAVSEA designated activities and include but 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/RMC 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 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//05H3//, 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 affect 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 05H3 coordinates EMC Certification in new construction ships, ships undergoing industrial availabilities and ships receiving new systems both in and outside of industrial availabilities. The EMC Certification testing is conducted by NAVSEA or NAVSEA qualified activities. There are two types of EMC Certification; System and Ship 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. System EMC Certification will be accomplished in accordance with references (f) for surface force ships and (g) for submarines:

a. For electrical/electronic systems installed by Fleet or Program Alterations in accordance with the Navy Modernization Process, Management and Operations Manual (NMP-MOM).

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

c. By NAVSEA 05H4 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, FMA or a contractor witnessed by a government activity for the subsequent System EMC Certifications using test procedures provided in references (a) and (b).

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 references (f) and (g):

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 for surface force ships and aircraft carriers and within two months prior to deployment for submarines (during Pre-Overseas Movement 2).

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) have been established in reference (h) 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 that 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 force ships and aircraft carriers.

(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 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 05H3 at (202) 781-3554, Defense Switched Network (DSN) 326-3554 or via the STAN website (https://www.semcip.com).

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 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 FMAs have adequate EMC technicians to support EMI surveys. If qualified EMC Technicians are not available at local FMA, NAVSEA personnel will be contacted to perform the EMC assessment or survey.

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

(1) Schedule FMA 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. NAVSEA personnel will be contacted to perform the EMI survey.

(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 shall:

(1) Maintain qualified EMC personnel (NEC-1419/Surface Force Ships and Aircraft Carriers) in coordination with NAVSEA 05H3 and ensure that test equipment assets are available to perform EMC assessments and surveys.

(2) Assist aircraft carriers, surface force/submarines in conducting EMC related PMS procedures when requested.

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

(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 aircraft carrier and surface force/submarine during the EMI survey departure briefing.

(6) Ensure participation of each aircraft carrier and surface force/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. Aircraft carrier, surface force/submarine Commanding Officers shall:

(1) Ensure EMI 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.

VOLUME VI

CHAPTER 5

DEFICIENCY DOCUMENTATION AND REPORTING

REFERENCES.

(a) OPNAVNOTE 4700 - Representative Intervals, Durations, Maintenance Cycles, and Repair Mandays for Depot Level Maintenance Availabilities of U.S. Navy Ships
(b) OPNAVINST 4780.6 - Policy for Administering Service Craft and Boats in the U.S. Navy
(c) OPNAVINST 4700.7 - Maintenance Policy for U.S. Naval Ships
(d) NAVSEA S0400-AD-URM-010/TUM – Tag-Out Users Manual
(e) NAVSEAINST 4790.8 - Ship's Maintenance and Material Management (3M) Manual
(f) NWP 1-03.1 - Naval Warfare Publication Operational Report
(g) MIL-STD-130N - Identification Marking of U.S. Military Property

LISTING OF APPENDICES.

A Equipment Operational Capability Range of Values and Definitions.

5.1 PURPOSE. The purpose of this chapter is to provide guidance on accurately documenting ship's material condition and on ensuring that this documentation is done in a timely and expeditious fashion. Deficiency documentation is used for determining and reporting a ship's material condition to ensure maximum operational readiness, maintain an adequate quality of life for embarked personnel, maximize safety for all personnel and ensure the ship reaches its designed service life. This documentation will be used for:

a. Accurate and timely material readiness reporting.

b. Reporting ship material deficiencies, requests for maintenance assistance or support equipment from off-ship maintenance activities and the documentation of completed maintenance actions.

c. Maintaining an accurate Current Ship's Maintenance Project (CSMP).

d. Maintaining an accurate and current ship's configuration database.

5.1.1 Background.

a. The Navy has identified the need for a more near real time, accurate and comprehensive understanding of an activity's material condition in a more timely fashion to support fleet material readiness reporting. Additionally, this information is used in developing, planning and executing more thorough and comprehensive maintenance availability work packages and to better project future material condition readiness and actionable trends.

b. Using existing maintenance documentation (Casualty Reports (CASREP), 3M Maintenance Action Forms (2 Kilo), Class Maintenance Plan (CMP), etc.), material readiness is calculated for equipment, systems, activities, ships or ship classes against various tasks, missions and warfare areas. This information is used by Navy leadership to determine an activity's ability to perform a desired mission or task, and to make recommendations for maintenance actions that can improve the ship's readiness to perform a mission or task. Further, it allows the maintenance community working with constrained budgets, to better prioritize maintenance that can most improve the activity's material readiness for a known mission or task.

c. Ship operations involve performing various Naval Tasks when, where and how required. While there may be multiple alternate means to accomplish any particular Naval Task to adequately support operations, equipment and systems must function as designed. Constrained resources (time, funds, and manpower) require better synchronization and prioritization of the maintenance effort.

d. Not all 4790/2Ks impact current material readiness reporting.

(1) Condition Based Maintenance (i.e., degraded equipment). Condition Based Maintenance deficiencies drive activity material readiness reporting. The reality of Naval operations is that equipment breaks and system performance is impacted. Condition Based Maintenance is the art of managing material failures. Condition Based Maintenance items run the scope from administrative requirements (placards, stenciling, etc.), run to fail items (e.g., light bulbs, fuses, etc.), gracefully degrading distributed systems (e.g., deck covering, lagging, corrosion, minor leaks, etc.) through catastrophic failures. The Equipment Operational Capability (EOC) Value, Descriptions and Example Table (Appendix A) describes graduations of material condition (fix it after it breaks, fix it before it breaks or fix it because it is about to break).

(2) Engineered Maintenance (i.e., CMP or Planned Maintenance System (PMS)). Until they exceed periodicity, engineered maintenance does not impact activity material readiness reporting. Typically time directed maintenance actions encompass the art of anticipating failure. Engineered maintenance includes both push and pull CMP items, items written to arrange services or order parts to support future PMS and Baseline Automated Work Packages written by life cycle managers as placeholders for historically anticipated depot work.

(3) Modernization (i.e., alterations). See Chapter 3 (Submarine Fleet Modernization Program) and Chapter 36 (Surface Force Ship/Aircraft Carrier Modernization Program of this volume. Planned modernization does not impact activity material readiness reporting. Modernization encompasses replacing obsolete equipment or systems, increasing capacity beyond installed design or adding new capabilities. However, because material deficiencies on replaced/removed equipment or systems are no longer applicable to the activity, material readiness may be positively impacted once modernization is accomplished.

(4) Services (i.e., tasks that support maintenance). Services do not impact activity material readiness. Services are overhead items (force protection, berthing ashore, cranes, etc.) in support of maintenance availabilities.

5.1.2 Scope. Except where indicated, this chapter applies to all ships and activities of the Navy (active and reserve). It does not apply to civilian operated ships assigned to the Military Sealift Command. Throughout this chapter, the term “ship” refers to all surface ships, aircraft carriers, submarines, shore activities and service craft specified in reference (a) and the term “activity” refers to both ship and shore activities. Ship’s Force refers to personnel assigned to any “activity”. Reference (b) provides policy and guidance for maintenance of service craft and boats not addressed in reference (c).

5.1.3 Definitions.

5.1.3.1 Material Readiness. Material Readiness, a term interchangeably used with Material Condition, is a value relative to the observed performance of a single component up to and including a system. The value is obtained through a process of the operator’s observation of the parameters for a component and comparing this measurement to a standard (e.g., design criteria or normal operating parameters). The result of the comparison is the value of Material Readiness or Material Condition. The Fleet Measure of Effectiveness is called the EOC. Found in Appendix A, for the full range of this dimensionless value is the Color Representation when displayed, a specific Definition, a Description and Shipboard Examples.

5.1.3.2 Maintenance Figure of Merit Index Value. The Maintenance Figure of Merit (MFOM) was developed as part of the Defense Readiness Reporting System (DRRS) to provide an objective measure of the true material condition of an activity. The MFOM Index Value is an objectively calculated value where the scale of values and definitions are the same as the EOC as described in Appendix A.

5.1.3.3 Maintenance Worthy. Maintenance Worthy is any object (system, equipment, component, sub component, part, etc.) that is Danger/Caution tagged or part of a tag out (i.e., tag hung on it) in accordance with reference (d), has maintenance preformed on it that is either planned (e.g., PMS, calibration, CMP, etc.) or corrective and has maintenance information (e.g., material history, meter readings, test information) recorded about it. Maintenance Worthy is contextually different from Configuration Worthy. Traditionally, Configuration Worthy was a term used

to describe the sparing plan requirements associated with onboard repair parts that enabled ships to be "maintenance self-sufficient" for periods of time away from home port or parent tender. Accordingly, the Consolidated Onboard Shipboard Allowance List provided great merit or support to self-sufficiency. The support of accurate and timely material readiness reporting necessitates the use of a broader term.

5.1.3.4 Current Ship's Maintenance Project. The CSMP, in accordance with references (c) and (e), is the primary repository of information concerning the material condition of the activity. The CSMP consists of two files, shipboard (local) file and the master (shore) file.

a. The Shipboard File shall be maintained by Ship's Force in a complete and current status at all times. The CSMP shall be used by the activity to document all completed without prior deferral preventive and corrective maintenance requirements. These deferred items shall be validated by Ship's Force and entered into the CSMP in accordance with reference (e) guidelines.

b. The Master File contains the material deficiencies uploaded from the shipboard (local) file, other work identified by shore-based managers and tasks from CMPs.

c. Reconciliation of the Shipboard File and Master File is the process of insuring that the two files are essentially the same.

NOTE: THE TERMS "4790/2K", "2K", "2 KILO", "AWR", "AUTOMATED WORK REQUEST", "AUTOMATED WORK NOTIFICATION", "NOTIFICATIONS", "AWN" AND "WORK CANDIDATE" ARE USED GENERICALLY THROUGH OUT THIS CHAPTER AND THIS MANUAL TO DESCRIBE ANY SHIP MAINTENANCE ACTION FORM.

5.1.3.5 Ship Maintenance Action Form. The Ship Maintenance Action Form (4790/2K), located in reference (e), is the principal means used to document material deficiencies and completed maintenance actions.

a. A Maintenance Ready 4790/2K contains correct and complete information, and provides an accurate diagnosis of the deficiency affecting the object.

b. Validated Maintenance Ready 4790/2K properly supports the planning and executing activities ability to understand the maintenance requirement; does not require the expenditure of additional manpower or time to obtain missing required data or information.

c. Completion 4790/2K contains:

(1) A detailed and comprehensive description of the "as found" condition.

(2) A synopsis of tasks and actions taken to complete the maintenance requirement.

(3) Failure Mode and Root Cause identified.

(4) Documentation of labor and material costs.

5.1.3.6 Casualty Report. The CASREP, in accordance with reference (f), is used to both notify the chain of command and the readiness stakeholders of degradations to operational readiness caused by deficiencies in an activity's material condition and alert support activities to the nature of outside assistance required for correction. A CASREP is made on a system or equipment which has a maintenance requirement that can not be corrected within 48 hours and the maintenance requirement reduces the activity's ability to perform an assigned task or mission (primary or secondary). The CASREP category (C2, C3, and C4) shall be determined in accordance with reference (f).

5.1.3.7 Department of Defense Readiness Reporting System. The DRRS was established by the Department of Defense (DoD) Directive 7730.65 (June 2, 2002) establishing the requirement and means to manage and report the readiness of the DoD and its subordinate components to execute the National Military Strategy as assigned by the Secretary of Defense in the Defense Planning Guidance, Contingency Planning Guidance, Theater Security Cooperation Guidance, and the Unified Command Plan. All DoD components will align their readiness reporting processes to DRRS. The DRRS will build upon processes and readiness assessment tools used in the DoD to

establish a capabilities-based, adaptive, near real-time readiness reporting system. All DoD Components will use the DRRS to identify critical readiness deficiencies, develop strategies for rectifying these deficiencies and ensure they are addressed in program/budget planning and other DoD management systems.

5.1.3.7.1 Joint Mission Essential Tasks. Joint Mission Essential Tasks are developed in support of missions as assigned by the Secretary of Defense. The Joint Mission Essential Tasks will be based on tasks derived from mission analysis using the language of the Universal Joint Task List. Additionally, the DoD components will develop Mission Essential Tasks or similar indicators for all assigned missions, and use information technology to collect near real-time data on the readiness of military forces and support organizations to perform these missions. The Mission Essential Tasks are based on mission analysis and approved by the commander as absolutely necessary, indispensable or critical to the success of a mission. For a given mission there is generally more than one Mission Essential Task that the object supports.

5.1.3.7.2 Navy Capabilities Readiness Reporting System. Subsequent guidance (NAVADMIN 172345ZAUG05) identified DRRS-N (Navy) as Navy's Capabilities Readiness Reporting System, identified OPNAV N4 as Resource Sponsor and identified United States Fleet Forces Command as executive agent.

5.1.3.8 Item Unique Identification. Item Unique Identification (IUID) is an asset identification system instituted by the United States DoD to uniquely identify a discrete tangible item or asset and distinguish it from other like and/or unlike tangible items. Reference (g) provides evolving clarification, increased insight and guidance regarding implementation of Machine-Readable Information (MRI) for item identification marking and automatic data capture associated with IUID. The IUID is used by MFOM and the Navy's Configuration Data Base of Record, Ship's Configuration and Logistics Support Information System to uniquely differentiate an object from other objects. IUIDs are either installed by the original manufacture or for legacy items, through the use of the eSOMS software and in accordance with reference (d).

5.2 RESPONSIBILITIES. Chapter 19 of this volume provides detailed responsibilities with respect to the implementation of policies for the Maintenance and Material Management (3-M) system as set forth in reference (e). The responsibilities delineated below represent an overview of those policies.

5.2.1 Ship's Force.

a. Ship's Force will comply with the guidance provided in reference (c) and paragraphs 5.3.1 through 5.3.1.2 of this chapter when submitting a 4790/2K.

b. Ship's Force will comply with guidance provided in reference (f) and paragraph 5.3.2 of this chapter when submitting a CASREP.

5.2.2 Immediate Superior In Command.

a. The Immediate Superior In Command is responsible for screening and technically reviewing all submitted 4790/2Ks.

b. The Immediate Superior In Command is responsible for technically reviewing all submitted CASREPs.

5.2.3 Maintenance Team. The Maintenance Team is responsible for reviewing and validating all submitted 4790/2Ks for content and technical correctness. When directed by the Type Commander (TYCOM), members of the Maintenance Team are responsible for validating, screening and brokering all 4790/2Ks.

5.2.4 Type Commander.

a. The TYCOM is responsible for validating, screening and brokering all 4790/2Ks.

b. The TYCOM is responsible for brokering all 4790/2Ks associated with any outstanding C3/C4 CASREP during the next scheduled maintenance availability if it has not previously been corrected as an emergent availability.

c. The TYCOM is responsible for:

(1) Complying with the policy provided in paragraph 5.3.2.3 of this chapter.

(2) Enforcing compliance with the policy of paragraph 5.3.2.2 of this chapter.

5.2.5 Fleet Maintenance Activity. The Fleet Maintenance Activity, as described in Volume II, Part I, Chapter 4 of this manual, will comply with paragraph 5.1.3.5.c of this chapter when preparing end of availability completion data associated with each 4790/2K.

5.3 GUIDANCE.

5.3.1 Generation of a Ship Maintenance Action Form OPNAV 4790/2K. The 4790/2K is the principal means used to document material deficiencies and completed maintenance actions. These actions require the highest degree of accuracy and accomplishment in a timely and expeditious fashion. This chapter provides policy and assigns responsibility applicable to specified 4790/2K data elements critical to obtaining outside support and material readiness reporting.

5.3.1.1 Required Instance for Documenting. A 4790/2K or Fleet approved equivalent is required:

a. To document a material deficiency.

b. When requesting help from outside activities (technical assistance, repair, calibration, etc.).

c. When ordering parts or materials.

d. For Selected Level Reporting.

e. When requesting special support or test equipment (hydrostatic pumps, rigging equipment, etc.).

f. For documenting a completed maintenance action (corrective or preventative).

g. When submitting a CASREP.

h. When submitting a temporary Departure From Specifications (DFS).

i. For any change in system or equipment configuration. (i.e., 4790/CK).

j. For documenting the results of an inspection or assessment.

k. For installation of a Ship Alteration (SHIPALT).

l. For support services during a maintenance availability.

m. For a CMP maintenance action.

5.3.1.2 Procedures for Documenting a Maintenance Action. A 4790/2K shall be filled out in accordance with reference (e) and the Software Users Guide for the Automated Information System being used. All Unclassified Non-Nuclear Naval Propulsion Information will be handled in accordance with current regulations and standing guidance from NAVSEA 08. The following policy guidance for data elements is provided:

a. The 4790/2K associated with a CASREP will remain open, even after the CASREP is cancelled, until repairs have been completed.

b. Every active CASREP must have at least one active associated 4790/2K. To ensure timely, accurate material readiness reporting when the CASREP is updated, the 4790/2K shall be updated concurrently. If circumstances dictate, a more appropriate active 4790/2K may be associated with the CASREP and the existing 4790/2K closed/canceled.

c. The associated 4790/2K to the CASREPs shall have a comparable or equivalent severity coding in accordance with reference (e). In particular, Ship's Force will ensure that the Equipment Status Code corresponds directly to the equipment configuration (Allowance Parts List (APL)/Equipment Identification Code (EIC)/Location) that the 4790/2K is written against. Examples where attention to detail is particularly warranted:

(1) 4790/2K written against the Main Engine when a thermometer is Out Of Commission (OOC). Equipment Status Code 2 (non-operational) should not be used since it indicates the Main Engine is OOC.

(2) 4790/2K written against a Weapons System when construction of storage space was requested. Assigning a Status Code 2 indicates the Weapons System is OOC.

d. Job Control Number (JCN). Only the approved Work Center codes found in Chapter 19 of this volume are to be used.

e. Attention to detail when selecting equipment configuration is critical. To support repair part ordering, some configuration data may be generic (e.g., circuit breaker in the Consolidated Onboard Shipboard Allowance List could have multiple applications). For readiness reporting purposes it's important to specify which application. Determine if the reported configuration would support an equipment Tag-Out. Configuration elements include:

(1) APL/Allowance Equipage List (AEL). Shall be written against the sub APL/AEL where applicable. Avoid using just any higher level APL/AEL for the system or equipment.

(2) EIC. Shall be for the lowest affected assembly, not just any higher level EIC for the system or equipment. The selected level of assembly should be lowest that fully encompasses the material deficiency.

(3) Equipment Serial Number: When multiple equipment (fire pumps, main engines, radio transceivers) have the same APL/EIC, ensure the serial number designation is appended.

(4) Location.

(5) Equipment Noun Name. Shall be the same name that would be used on a Danger/Caution Tag in accordance with reference (d).

f. Type of Availability (T/A).

(1) T/A recommended for performance of a deferral, reference (e), is provided in Table 5-1.

Table 5-1

T/A Code	Description
1	Depot (shipyard or ship repair facility)
2	Intermediate Maintenance Activity (tender, repair ship, etc.)
3	TYCOM Support Unit (floating dry dock, etc., or technical assistance from Systems Command, Organic Technical Authority or contractor representative)
4	Ship's Force
0	Not Applicable
U	(Mission Degrading) (entered on 2K) Used by Board of Inspection and Survey, field identifies certain deficiencies which are considered as preventing the activity from carrying out some part of its mission.

(2) Table 5-2 provides guidance for documenting deferred maintenance actions.

Table 5-2

Scenario/Issue	Use T/A Code
When requesting technical assistance from off-hull activities.	3
When requesting repair (industrial) from outside activities.	1 or 2
When requesting calibration from outside activities.	1 or 2
When ordering parts or materials for Ship's Force use.	4
For data reporting.	3
When requesting special support or test equipment (hydrostatic pumps, rigging equipment, etc.).	3
Completed without prior deferral.	4
When submitting a CASREP.	1, 2, 3 or 4
When submitting a temporary DFS.	1, 2 or 4
For any change in system or equipment configuration.	3
For documenting the results of an inspection or assessment.	3
For installation of a SHIPALT/Ship Change Document.	1, 2 or 4
For support services during a maintenance availability.	3
For a CMP maintenance action.	1 , 2, 3 or 4

g. Status Code (STA).

(1) OPERATIONAL shall be selected when the system or equipment is operational with only minor discrepancies that do not impact performance. (Similar to EOC 0.8 – 1.0: See Appendix A)

(2) NON-OPERATIONAL shall be selected when the system or equipment is totally inoperative, or is severely degraded with major operation restrictions and may be a threat to personnel safety. (Similar to EOC 0.0 - 0.4: See Appendix A)

(3) REDUCED CAPABILITY shall be selected when the system or equipment is operational with discrepancies that could potentially impact performance, or has minor operational restrictions that are not a threat to personnel safety. (Similar to EOC 0.5 - 0.7: See Appendix A)

(4) NOT APPLICABLE (Equivalent to EOC 1.0) shall be selected:

(a) When ordering parts for PMS.

(b) When updating a 4790/2K and the object has been repaired, but the JCN cannot be closed due to awaiting parts.

(c) When requesting services such as printing, plaques, special support equipment, test equipment, etc.

(d) For data reporting.

(e) For SHIPALTs/Ship Change Documents.

(f) For system or equipment configuration changes (4790/CK).

(g) When requesting support services in a maintenance availability.

(h) For future time directed CMP and PMS maintenance tasks.

h. Safety Hazard Code. Enter the applicable Safety code in accordance with reference (e).

i. Ship's Force Man-Hours expended (S/F MHRS. EXP). Accurately document Ship's Force man-hours expended. Do not include man-hours expended by outside agencies as those agencies will document their own man-hour expenditures.

j. Ship's Force Man-Hours Remaining (S/F MHRS. REM.). Enter only the estimate of future required Ship's Force man-hours remaining. If estimate changes, update the 4790/2K.

k. Deadline Date.

(1) Depot (shipyard or ship repair facility) (T/A-1) the Deadline Date is required. The date entered is the end of the scheduled maintenance availability.

(2) Intermediate Maintenance Activity (tender, repair ship, etc.) (T/A-2) the Deadline Date is required. The date entered is the end of the scheduled maintenance availability.

(3) TYCOM Support Unit (floating dry dock, etc., or technical assistance from Systems Command, organic technical agents or contractor representative) (T/A-3) is required. Date entered is the entry date plus a realistic estimated time to repair. Update to the Deadline Date is required if the estimate changes.

(4) Ship's Force (T/A-4) is required. Date entered is the entry date plus a realistic estimated time to repair. Updates to Deadline Date are required if the estimate changes.

l. Meter Reading. A meter reading is required for components or equipment outfitted with a meter whenever a 4790/2K is submitted or updated.

m. Remarks/Description. Comments shall be accurate and concise with clarity. The wording must accurately portray present and potential impacts on the object or system material condition. Classified or Navy Nuclear Power Information is prohibited from being entered into the work candidate. If a full description of the material deficiency requires the use of classified information, a separate message should be generated with the required data and the message referred to in block 35 by message Date Time Group. The following are minimum requirements for Block 35:

(1) Depot (shipyard or ship repair facility) (T/A-1):

(a) Concisely describe the failure or malfunction and what caused it. Include how and when the casualty was discovered. Provide description of the casualty to include information on operating configuration symptoms and indications.

(b) Concisely describe the actions taken by Ship's Force and outside activities to troubleshoot and correct the failure or malfunction. Include initial follow-up and troubleshooting, Ship's Force repair efforts or technical assistance received.

(c) Include any test results from troubleshooting.

(d) Include the reason for deferral to an off ship maintenance activity.

(2) Intermediate Maintenance Activity (tender, repair ship, etc.) (T/A-2):

(a) Concisely describe the failure or malfunction and what caused it. Include how and when the casualty was discovered. Provide description of the casualty to include information on operating configuration symptoms and indications.

(b) Concisely describe the actions taken by Ship's Force and outside activities to troubleshoot and correct the failure or malfunction. Include initial follow-up and troubleshooting, Ship's Force repair efforts or technical assistance received.

(c) Include any test results from troubleshooting.

(d) Include the reason for deferral to an off ship maintenance activity.

(3) Technical Assistance in troubleshooting (T/A-3):

(a) Concisely describe the failure or malfunction and what caused it. Include how and when the casualty was discovered. Provide description of the casualty to include information on operating configuration symptoms and indications.

(b) Concisely describe the actions taken by Ship's Force to troubleshoot and correct the failure or malfunction. Include initial follow-up and troubleshooting, Ship's Force repair efforts or previous technical assistance.

(c) Include any test results from troubleshooting.

(d) Clearly specify the type of outside assistance and the time frame desired by the activity.

(4) Technical Assistance in obtaining special support or test equipment (T/A-3):

(a) Describe the special support or test equipment required by the activity.

(b) Describe the maintenance action for which the equipment will be used.

(c) Include any assistance the activity may need from the requesting activity (e.g., training, assistance in operating the equipment, etc.).

(d) Clearly specify the dates the equipment is needed and estimated time the equipment will be returned.

(5) Technical Assistance documenting the results of an inspection or assessment (T/A-3):

(a) The inspection or assessment activity shall provide the activity with a maintenance ready 4790/2K.

(b) Documentation of assessment results by the equipment Subject Matter Expert will include all the technical data needed to complete a 4790/2K as specified in Chapter 42 of this volume.

(6) Technical Assistance in obtaining support services during a maintenance availability (T/A-3):

(a) Describe the support service required by the activity.

(b) Describe the maintenance action for which the support service will be used.

(c) Include any assistance the activity may need from the requesting activity (e.g., training, assistance in operating the equipment, etc.).

(d) Clearly specify the dates the support services are needed and estimated time the support services will no longer be required.

(7) Ship's Force maintenance action (T/A-4):

(a) Concisely describe the failure or malfunction, and what caused it. Include how and when the deficiency was discovered. Provide description of the deficiency to include information on operating configuration symptoms and indications.

(b) Concisely describe the actions taken by Ship's Force to correct the failure or malfunction. Include initial follow-up and troubleshooting, Ship's Force repair efforts or previous technical assistance.

(c) Include any test results from either troubleshooting or post repair testing.

n. Priority code is required.

(1) Mandatory. The system or equipment is not functioning within designed parameters and may only be operated under emergency conditions. May be a threat to personnel safety or is a critical damage control item. Required to sustain bare minimum acceptable level of human needs and sanitation. The system or equipment failure/malfunction causes a major degradation or total loss of primary mission (C-4 CASREP equivalent).

(2) Essential. The system or equipment is severely degraded with major operational restrictions and may only be operated under emergency conditions. Further damage may result from continued operations. Poses no threat to personnel safety. Extremely important safety or damage control item. Required to sustain normal level of basic human needs and sanitation. Will contribute so markedly to efficient and economical operation and maintenance of a vital system that the payoff in the next year will overshadow the cost to accomplish. Required for minimum acceptable level of preservation and protection. Required for sustained performance of activity's mission. Required to maintain overall integrity of activity or a system essential to activity's mission. Under emergency. The system or equipment failure/malfunction causes a major degradation but not the total loss of primary mission (C-3 CASREP equivalent).

(3) Highly Desirable. The system or equipment is operable with deficiencies that affect performance. No restrictions on operation. The system or equipment is capable of performing intended functions, but not to all designed performance standards, or not capable of performing required functions in all operating modes. Important safety or damage control item. Required for normal level of human comfort. Required for efficient performance of activity's mission. Required for overall integrity of equipment or systems that are not essential, but are required as backups in case of primary system failure. Will contribute so markedly to efficient and economical operation and/or maintenance of a vital system that the payoff in the next year will at least equal the cost to accomplish. Will effect major reduction in future maintenance in an area or system that presently cannot be maintained close to acceptable standards. Required to achieve minimum acceptable level of appearance. The system or equipment failure/malfunction causes a major degradation or total loss of a secondary mission (C-2 CASREP equivalent).

(4) Desirable. The system or equipment is operable with minor discrepancies that do not impact performance. Required for overall integrity of other than an essential system or its backup system. Some contribution to efficient performance. Some contribution of normal level of human comfort and welfare. Will contribute to appearance in an important area. Will significantly reduce future maintenance.

5.3.2 Generation of a Casualty Report. The CASREP is used to both notify the chain of command and readiness stakeholders of degradations to operational readiness caused by deficiencies in an activity's material condition and alert outside support activities to the nature of outside assistance required for correction. The CASREP is not a one time report, but has four distinct types; initial, update, correct or cancel, as specified and described in reference (f). Submitting a CASREP does not relieve the requirement for timely submission of work notifications (OPNAV 4790/2K) or material requisitions.

5.3.2.1 Guidance on Initial Documenting with a Casualty Report. A CASREP shall be prepared in accordance with reference (f) and the Software Users Guide for the Automated Information System being used. This section does not apply to Fleet Ballistic Missile systems under the cognizance of Strategic Systems Programs. All Unclassified Non-Nuclear Naval Propulsion Information will be handled in accordance with current regulations and standing guidance from NAVSEA 08. The following policy guidance is provided:

a. C3/C4 CASREPs identify severe task or mission degradation that generally requires emergent repairs be effected at the earliest opportunity. C2 CASREPs are less severe and are generally corrected during scheduled maintenance availabilities. C2 CASREPs requiring Fleet Technical Assistance (i.e., Distance Support or onboard Technical Assistance) in determining repairs should result in the technical assistance completed well enough in advance of the scheduled maintenance availability to facilitate repairs during the maintenance availability.

(1) CASREP category shall be assigned in accordance with reference (f). It shall not be elevated solely to expedite onboard technical assistance, services, parts delivery or repairs.

(2) Any outstanding C3/C4 CASREP requiring repair assistance should be repaired during the next scheduled maintenance availability if it has not previously been corrected in an emergent availability.

(3) If an outstanding C2 CASREP requiring repair assistance is not scheduled for repairs during the next scheduled maintenance availability, it should not be canceled and repairs should be pursued following the normal C2 CASREP procedures.

b. Submitting a CASREP during maintenance availabilities is only justified if repairs to the system or equipment resulting in the task or mission degradation will not be corrected during the maintenance availability.

c. An activity shall submit a cancellation CASREP (Casualty Cancellation (CASCAN)) upon the commencement of a maintenance availability for which the effected system or equipment is scheduled for repair.

d. Do not CASREP hardware or software that have not completed system operational testing or have not been turned over to the activity for operational use (e.g., System Operation Verification Testing, Acceptance Trials, post availability testing).

e. Ship's Force or others may not submit a CASREP for installation of an alteration that will provide for either modernization of existing systems or equipment, or add new capability. CASREPs are used to document material readiness issues with installed systems or equipment. See Volume II, Part I, Chapter 2, Section 2.6 of this manual for questions concerning alterations.

f. Any system or equipment casualty that would threaten to cause or cause a discharge of oil or oily waste to sea shall be reported with a CASREP.

g. Any equipment mishap involving damages or losses exceeding $50,000 shall be reported with a CASREP. The CASREP alerts the Naval Safety Center an incident has occurred that requires a mishap investigation.

h. Estimated Time to Repair (ETR). The ETR must be realistic and an accurate ETR is required for all repairs. Simply extending the ETR by three days (or 30 days for C2) every update period does not support the intent of providing an ETR. If the problem will not be corrected within 24 hours of the ETR, send an update to change the ETR.

i. A 4790/2K is required to receive off-ship assistance (technical, repair, parts) or to document Ship's Force work. Every active CASREP shall be associated with an active JCN – no exceptions.

(1) CASREPs shall never be generated with associated 4790/2Ks that have an Equipment Status Code of 1 (operational) or 0 (N/A), or a Priority code of 4 (routine). If the CASREP is required, then the Equipment Status Code and Priority code for the 4790/2K need to be updated.

(2) The associated 4790/2K must have the correct configuration data (e.g., APL, EIC) to the lowest assembly and that configuration data must be reported on the CASREP.

(3) To associate multiple 4790/2Ks with a CASREP, pick a primary 4790/2K to list as JCN and list the remaining 4790/2Ks in the remarks section. If parts are ordered against other APLs than the APL used on the primary associated 4790/2K, those APLs shall be listed in the amplification line of the parts section.

j. An assist line is mandatory for an initial CASREP and optional on subsequent updates. In the ASSIST AMPN line clearly specify type of off-ship assistance and the time frame desired by the activity. Clearly identify Distance Support efforts. The following options are acceptable:

(1) Assist/Technical/Distance.

(2) Assist/other/Distance.

(3) Assist/none.

k. CASREP description and remarks should be concise and consistent with the 4790/2K without sacrificing clarity. The system or equipment listed in the casualty line shall indicate the affected assembly. Wording shall accurately portray present and potential impacts on the task or mission. The remarks section for an initial CASREP shall contain the paragraphs below. Indicate the classification at the beginning of individual sub-paragraphs to facilitate access to non-classified information.

(1) Summary/Impact: Brief executive overview of casualty and impact to the activity's task or mission is clearly identified in the opening paragraph. (e.g., Summary/Impact: 2 of 5 fire pumps degraded (OOC) with 2 of 2 fire pumps in Fire Zone 2 degraded (OOC). CASREP 2009001 refers. Loss of redundancy in supplying firemain. Major degradation in MOB-D. Fully Mission Capable.)

(a) Indicate if this message reflects a downgrade to C2 or upgrade to C3/C4.

(b) Identify any loss of operational capabilities such as speed, power output, detection range, self defense, loss of a sensor, etc.

(c) Equipment serial number, location and number of similar equipments (backup or redundancy).

(d) Identify warfare areas degraded and assess capability to perform current or future scheduled missions.

(2) Technical Description: Concise synopsis of sufficient granularity to facilitate future Distance support or prepare shore maintenance support services.

(a) How and when the casualty was discovered. Provide description of the casualty to include information on operating configuration, symptoms and indications, initial follow-up and troubleshooting.

(b) Repair efforts completed to date, or technical assistance received.

(c) To facilitate distance support, include any test results from troubleshooting.

(3) Pending Actions: Any ongoing or anticipated actions to be taken by Ship's Force or any outside activity.

(4) Activity Point of Contact: Include name, best time period and the best way to contact the Point of Contact in Zulu time. Typically phone numbers and E-mail addresses are provided.

(5) Mishap Report: (If required) Is required to identify whether it has been completed or is still in progress. If in progress, an estimated completion time should be provided.

(6) Ships Schedule: For the next 30 days at a minimum. Where appropriate, indicate next scheduled maintenance availability.

(7) Minimize Considered: (When required) Ensure this statement is included inside the remarks section.

l. CASREP transmission/receipt/processing.

(1) Ship's Force is responsible to verify CASREPs reach the intended recipients. There have been incidents where a CASREP has been released via naval message, but has not reached the intended recipients intact. Attention to detail with respect to Plain Language Addressees (PLAD), a well trained Radio Central and a controlled chop process are key to success. At a minimum, COMUSFLTFORCOM Norfolk VA (AIG 6842 or 6843) shall be included on all CASREPs to ensure the CASREP is captured in the shore based CASREP Automated Information System.

(2) Ship's Force shall ensure CASREPs are forwarded in a timely manner when requested.

5.3.2.2 Guidance on Updating a Casualty Report. Follow the format guidelines defined in paragraph 5.3.2.1 of this chapter for Initial CASREPs. CASREP update is required for:

a. Revisions to previously submitted information.

b. Changes in parts status including receipt of parts.

c. Requests for additional assistance (an assist line is mandatory).

d. Substitution of an alternate active 4790/2K in place of a closed/canceled one.

e. Changes to ship's schedule.

f. Changes to ETR (CASREP updates are to me made 24 hours prior to the expiration of the ETR).

g. C4 CASREP, at least every 72 hours.

h. C3 CASREP at least every 10 days.

i. C2 CASREP every 30 days.

NOTE: IF A DEFERRED CASREP IS CORRECTED AT ANYTIME DURING THE DEFERRED PERIOD, A CASCOR SHALL BE SUBMITTED.

5.3.2.3 Guidance on Deferral of a Casualty Report. The TYCOM is required to approve any planned delay of action on a CASREP. In the event that the delay effectively constitutes a CASREP deferral, the activity will forward the deferral recommendation to the TYCOM for approval. A CASREP Deferral is submitted when it is determined that the CASREP will not be corrected while the activity is in the Sustainment Phase (i.e., deployment or surge). This action places the CASREP in an inactive status which reduces the support and eliminates the activity's requirement for updating the CASREP.

a. The activity shall not report a CASREP as deferred until directed by the TYCOM or his designated representative.

b. The activity shall submit a CASREP update with the word DEFRD in the estimated time of repair section of a CASREP update. See reference (f) for details.

NOTE: CASREPS SHALL NOT REMAIN OPEN FOR RECEIPT OF PARTS IF THE SYSTEM OR EQUIPMENT IS OPERATIONAL. SENDING A CASUALTY CORRECTION (CASCOR) WITH PARTS REQUESTED VIA A WHISKEY NUMBER WILL NOT CANCEL THE PARTS REQUISITION.

5.3.2.4 Guidance on Correction of a Casualty Report.

a. CASREP Correction is required:

(1) After repairs are completed to the affected system or equipment to restore to operational condition. If the system or equipment subsequently fails operational testing, a new CASREP shall be submitted.

NOTE: MAINTENANCE ASSIST MODULES INSTALLED ASSEMBLIES ARE CONSIDERED TEMPORARY REPAIRS.

(2) After temporary repairs have been accomplished, and the system or equipment restored to operational status to support the task or mission. Most temporary repairs will require a DFS (see Volume V, Part I, Chapter 8 of this manual) with its associated active 4790/2K until permanent repairs are completed in accordance with all technical requirements.

b. Include in the remarks section of the CASCOR:

(1) A detailed but concise summery of repairs. If operational testing was not completed, include an estimated date for accomplishment.

(2) Ship's Force understanding of what the root cause was for the failure (e.g., normal wear and tear, inadequate design, power transient, etc.). Normally the root cause will mirror the input for block 8 on the 4790/2K.

(3) Hours since last failure of the system or equipment prior to the initiation of the CASREP.

(4) Adequacy of Ship's Force resources to prevent or correct the CASREP. Details should be provided as to what contributed to the CASREP (e.g., troubleshooting procedures, PMS coverage, parts support, test equipment, conduct of drills, operational policy, technical documentation, training, manning, etc.). Include actions taken to correct lack of resources.

5.3.2.5 Guidance on Cancellation of a Casualty Report.

a. An activity shall submit a cancellation CASREP (CASCAN) upon the commencement of a maintenance availability for which the affected system or equipment is scheduled for repair. Ensure the maintenance availability for which repairs are scheduled is recorded in the remarks section of the CASCAN.

b. If all associated 4790/2Ks are closed or cancelled without repairs being affected, the corresponding CASREP must be cancelled (CASCAN).

APPENDIX A

EQUIPMENT OPERATIONAL CAPABILITY RANGE OF VALUES AND DEFINITIONS

Examples are found below:

EOC Value - 1.0 (Green) EOC DEFINITION - Fully Operable.

EOC Description – Configuration or maintenance worthy object appears to be in very good material condition. It has no evidence of corrosion or noticeable discrepancies. Notification created only for Preventive Maintenance actions or ordering parts.

Actions – Document man-hour expenditures.

EOC Value - 0.9 (Green) EOC DEFINITION - Fully Operable with Cosmetic Discrepancies.

EOC Description – Maintenance worthy object works with only cosmetic discrepancies. It may have slight corrosion. The documented discrepancy does not affect performance. There are no anticipated problems or a need for troubleshooting.

Actions - Equipment requires cleaning or minor maintenance that may be accomplished by Ship's Force. Document man hour expenditures.

Shipboard Examples:

AIR - Minor leaks (moisture, drips) that do not present a safety hazard. Missing label plates and/or stenciling. Worn paint/scratches on consoles. Surface Dirty. Minor Surface rust present.

C4I/CS - Minor leaks (moisture, drips) that do not present a safety hazard. Missing label plates and/or stenciling. Worn paint/scratches on consoles. Surface Dirty. Minor Surface rust present.

HM&E - Minor leaks (moisture, drips) that do not present a safety hazard. Missing label plates and/or stenciling. Worn paint/scratches on consoles. Surface Dirty. Minor Surface rust present.

Corrosion - Minor Surface rust present. Few corroded topside fasteners. Tank coatings recently inspected. Lifelines have light rust.

EOC Value - 0.8 (Green) EOC DEFINITION – Fully Operable with No Performance Impacting Discrepancies.

EOC Description - Maintenance worthy object works with no loss in performance but has minor discrepancies or minimal corrosion. Problems are anticipated or troubleshooting is necessary. Minor redundancy impacted with no effect on performance.

Actions – Document man-hour expenditures and 4790/2K deferral for future Ship’s Force actions.

Shipboard Examples:

AIR - Centrifugal pumps cavitate too much. Indicator lights are burnt out. Filters need to be changed.

C4I/CS - Centrifugal pumps cavitate too much. A minor number of redundant modules within electronic systems (SLQ-32, SPY-1, etc.) are inoperative. Indicator lights are burnt out. Filters need to be changed.

HM&E - Centrifugal pumps cavitate too much. Indicator lights are burnt out. Filters need to be changed.

Corrosion - Some running rust topside. Bilge foundations need preservation. Discolored deck non-skid. Vent plenums have some minor corrosion damage

EOC Value - 0.7 (Yellow) EOC DEFINITION - Operable with minor discrepancies that do not impact performance.

EOC Description – Maintenance worthy object works with no loss in performance but has significant discrepancies that need to be corrected or monitored. One of many modes may be inoperative. Minor corrosion.

Actions – 4790/2k notification needs to be created for discrepancies or requesting outside activity assistance in troubleshooting. Troubleshooting procedures should be initiated. Consult reference (d) for proper usage of Yellow Caution Tags.

Shipboard Examples:

AIR - Vibration levels for rotating equipment are approaching limits or rising. Object running hotter than normal. Pressure drops more than maximum. Radar fails minimum transmit power specification by a small amount. Significant leakage of fluid(s). Expansion tank levels dropping. Chemistry difficult to maintain.

C4I/CS - Vibration levels for rotating equipment are approaching limits or rising. Object running hotter than normal. Pressure Drops more than maximum. Radar fails minimum transmit power specification by a small amount. Significant leakage of fluid(s). Expansion tank levels dropping. Chemistry difficult to maintain.

HM&E - Vibration levels for rotating equipment are approaching limits or rising. Object running hotter than normal. Pressure drops more than maximum. Significant leakage of fluid(s). Expansion tank levels dropping. Chemistry difficult to maintain.

Corrosion - Running rust in several topside areas. Fasteners in topside boxes need replacement. Tank coating work package close to availability maximum. Watertight Door hinges and latches rusted.

EOC Value - 0.6 (Yellow) EOC DEFINITION - Operable with discrepancies that could potentially impact performance in the future. No Restrictions.

EOC Description – Maintenance worthy object works with no current loss in performance but performance degradation is anticipated. Significant discrepancies need to be corrected or troubleshooting initiated to prevent performance degradation. Corrosion could impact performance if not corrected.

Actions – A standing order must be issued to ensure all watch standers are aware of the work around modification to operating instructions and procedures. 4790/2K notification needs to be created for discrepancies. Consult Volume V, Part I, Chapter 8 of this manual for requirements for submitting a DFS.

Shipboard Examples:

AIR - Leaks that can be controlled (prevented from becoming a safety issue) by wiping up. Temperature that can be controlled by using artificial cooling. Electronic cooling water low flow alarm bypassed because of a faulty flow switch and flow must be monitored by a designated watch stander.

C4I/CS - Leaks that can be controlled (prevented from becoming a safety issue) by wiping up. Temperature that can be controlled by using artificial cooling. Electronic cooling water low flow alarm bypassed because of a faulty flow switch and flow must be monitored by a designated watch stander.

HM&E - Leaks that can be controlled (prevented from becoming a safety issue) by wiping up. Temperature that can be controlled by using artificial cooling. Electronic cooling water low flow alarm bypassed because of a faulty flow switch and flow must be monitored by a designated watch stander. Testing salinity manually/sounding tanks manually with alarms disabled. Shifting steering could only be accomplished in after steering with bridge syncro OOC.

Corrosion - Incipient damage to structure due to corrosion. Tank work package at limit for next availability. Bilges have loose rust. Fasteners broken due to heavy corrosion. Crew engaged in extensive topside preservation. Some cause code 8 2Ks in CSMP. Vent Plenums significant rusting.

EOC Value - 0.5 (Yellow) EOC DEFINITION - Operable with discrepancies that effect performance. No restrictions on operation.

EOC Description – Maintenance worthy object is capable of performing intended functions, but not to all designed performance standards, or not capable of performing required functions in all operating modes.

Actions – A standing order must be issued to ensure all watch standers are aware of the work around modification to operating instructions and procedures. 4790/2K notification needs to be created for discrepancies. Based on status of related equipment/systems, consult reference (f) for requirements for submitting a CASREP. Consult reference (d) for proper usage of Red Tags for troubleshooting.

Shipboard Examples:

C4I/CS - Primary power to weapons system has failed and system is operating on alternate power.

HM&E - Ship speed degraded due to hull fouling. Evaporators operating at reduced capacity (less than 50% of optimum capacity).

Corrosion - Corrosion induced structural damage. Hull thinning based on UT measurements. Loose topside fixtures due to missing or corroded fasteners. Localized non-skid coating failures.

EOC Value - 0.4 (Red) EOC DEFINITION - Restricted operation. Significant discrepancies.

EOC Description – Maintenance worthy object not operating correctly and no means or work arounds allow the object to do everything it was designed to perform.

Actions – 4790/2K notification needs to be created for discrepancies. Based on status of related equipment/systems, consult reference (f) for requirements for submitting a CASREP. Consult reference (d) for proper usage of Red Tags.

Shipboard Examples:

AIR - Radar operates but to a reduced range.

C4I/CS - Radar operates but to a reduced range.

HM&E - Main Engine Lube Oil Pump sequencing not consistent.

Corrosion - Tank contents contaminated due to leakage. Ladder corrosion limits personnel access. Many tanks require immediate preservation. Non-skid Coefficient of Friction failures.

EOC Value - 0.3 (Red) EOC DEFINITION - Severely degraded with major operational restrictions.

EOC Description – Maintenance worthy object not operating correctly or performing intended functions. Not a threat to personnel safety but further equipment damage may occur from continued operation.

Actions – 4790/2K notification needs to be created for discrepancies. Based on status of related equipment/systems, consult reference (f) for requirements for submitting a CASREP. Consult reference (d) for proper usage of Red Tags.

Shipboard Examples:

AIR - Can operate a piece of equipment in local manual subject to the watch stander's response time, but not in remote automatic as designed. Remote operators are all inoperative, so space isolation can only be accomplished locally.

C4I/CS - Can operate a piece of equipment in local manual subject to the watch stander's response time, but not in remote automatic as designed. Weapons system cannot accept engagement orders from Combat Direction System, but can be operated manually. Remote operators are all inoperative, so space isolation can only be accomplished locally.

HM&E - Can operate a piece of equipment in local manual subject to the watch stander's response time, but not in remote automatic as designed. Remote operators are all inoperative, so space isolation can only be accomplished locally.

Corrosion- Structural damage to superstructure due to corrosion that restricts access. Corroded and inoperable combat systems equipment. Corrosion to key sensors. Watertight doors inoperable due to corroded hinges.

EOC Value - 0.2 (Red) EOC DEFINITION - Repair Before Operation (RBO).

EOC Description – Maintenance worthy object not functioning within designed parameters and may only be operated under emergency conditions.

Actions - Secure or turn off object. Use object only in an operational emergency. 4790/2K notification needs to be created for discrepancies. Based on status of related equipment/systems, consult reference (f) for requirements for submitting a CASREP. Consult reference (d) for proper usage of Red Tags.

Shipboard Examples:

AIR - Certified Inspector identifies a RBO discrepancy. Loss of dry air system (or electronic cooling water) to a Radar.

C4I/CS - Certified Inspector identifies a RBO discrepancy. Loss of dry air system (or electronic cooling water) to a Radar.

HM&E - Certified Inspector identifies a RBO discrepancy. Boiler inspection device not available.

Corrosion - Significant tank leakage due to corroded structure. Evidence of cracking in structural elements. Lifelines corroded through.

EOC Value - 0.1 (Red) EOC DEFINITION - Should not be operated/Battle Short.

EOC Description – Maintenance worthy object not functioning. Secure or turn off immediately.

Actions - Secure or turn off immediately. 4790/2K notification needs to be created for discrepancies. Based on status of related equipment/systems, consult reference (f) for requirements for submitting a CASREP. Consult reference (d) for proper usage of Red Tags.

Shipboard Examples:

AIR - Steam Receiver alarms are all cut out.

C4I/CS - Safety Cutouts missing on gun mount.

HM&E - Generator vibrates, arcs and sparks. Boiler alarms are all cut out.

Corrosion - Critical tanks corroded so that they cannot be used (Fuel Oil Service, Potable Water, JP-5 or Reserve Feed).

EOC Value - 0.0 (Red) EOC DEFINITION - Totally Inoperative.

EOC Description – Maintenance worthy object does not work at all.

Actions – 4790/2K notification needs to be created for discrepancies. Based on status of related equipment/systems, consult reference (f) for requirements for submitting a CASREP. Consult reference (d) for proper usage of Red Tags.

Shipboard Examples:

AIR - Turn on/off switch on and no response. Pump or equipment removed.

C4I/CS - Turn on/off switch on and no response. Pump or equipment removed.

HM&E - Turn on/off switch on and no response. Pump or equipment removed.

Corrosion - Corrosion in hull such that leakage from sea is occurring.

The EOC range of values and definitions are provided below:

Title	EOC value or range	Description/Definition
Fully Operable	1.0 (Green)	Configuration or maintenance worthy object appears to be in very good material condition. It has no evidence of corrosion or noticeable discrepancies. Notification created only for Preventive Maintenance actions or ordering parts.
Fully Operable with Cosmetic Discrepancies	0.9 (Green)	Maintenance worthy object works with only cosmetic discrepancies. It may have slight corrosion. The documented discrepancy does not affect performance. There are no anticipated problems or a need for troubleshooting.
Fully Operable with no Performance impacting discrepancies	0.8 (Green)	Maintenance worthy object works with no loss in performance but has minor discrepancies or minimal corrosion. Problems are anticipated or troubleshooting is necessary. Minor redundancy impacted with no effect on performance.
Operable with minor discrepancies that do not impact Performance	0.7 (Yellow)	Maintenance worthy object works with no loss in performance but has significant discrepancies that need to be corrected or monitored. One of many modes may be inoperative. Minor corrosion.
Operable with discrepancies that could potentially impact Performance in the future. No Restrictions	0.6 (Yellow)	Maintenance worthy object works with no current loss in performance but performance degradation is anticipated. Significant discrepancies need to be corrected or troubleshooting initiated to prevent performance degradation. Corrosion could impact performance if not corrected.
Operable with discrepancies that effect Performance. No restrictions on operation.	0.5 (Yellow)	Maintenance worthy object is capable of performing intended functions, but not to all designed performance standards, or not capable of performing required functions in all operating modes.
Restricted operation. Significant discrepancies.	0.4 (Red)	Maintenance worthy object not operating correctly and no means or work around allows the object to do everything it was designed to perform.

Severely degraded with major operational restrictions.	0.3 (Red)	Maintenance worthy object not operating correctly or performing intended functions. Not a threat to personnel safety but further equipment damage may occur from continued operation.
Repair Before Operation	0.2 (Red)	Maintenance worthy object not functioning within designed parameters and may only be operated under emergency conditions.
Should not be operated/Battle Short	0.1 (Red)	Maintenance worthy object not functioning. Secure or turn off immediately.
Totally Inoperative	0.0 (Red)	Maintenance worthy object does not work at all.

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VOLUME VI

CHAPTER 6

INDUSTRIAL PLANT EQUIPMENT

REFERENCES.

(a) NAVSO P 1000 - Navy Comptroller Manual
(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 4855.3 - 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 Area Commander for funding consideration and local procurement by the requesting activity.

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 Type Commander (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 assigned activity's 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).

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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.

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VOLUME VI

CHAPTER 7

SUBMARINE FORCES AFLOAT PAINTING AND PRESERVATION GUIDELINES FOR NON-NUCLEAR SPACES AND COMPONENTS

REFERENCES.

(a) NAVSEA S9086-VD-STM-010 - NSTM Chapter 631 (Preservation of Ships In-Service - General)
(b) URO-MRC 003 - Conduct Hull Structural Survey
(c) SUBMEPP MS 6310-081-015 - SUBMEPP Maintenance Standard - Submarine Preservation
(d) COMNAVSUBFORINST 5400.39 - Standard Submarine Organization and Regulations Manual
(e) OPNAVINST 5100.19 - Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
(f) SSPC Painting Manual - Society for Protective Coating Standards and Specifications
(g) NAVSEA 6310-081-015 - Technical Handbook for Special Hull Treatment Maintenance and Repair for Submarines

LISTING OF APPENDICES.

A Submarine Paint Guide
B Coating Inspection Report Form
C Shipboard Power Cleaning Tools

7.1 INTRODUCTION. The objective of this document is to provide Fleet Maintenance Activities (FMA) with the procedures necessary to perform preservation maintenance between major shipyard availabilities. It has consolidated all the necessary knowledge from reference (a) for submarine crews that may be inexperienced in the areas of surface preparation and touch-up painting to maintain protective coating systems. This document is to be used in maintaining and repairing preservation systems on non-nuclear components and spaces of U.S. Navy submarines. Appendix A is a guide to assist with preparing, handling and applying paint to interior submarine surfaces.

7.1.1 Applicability.

a. This document is not to be used during regular shipyard work, where all prevailing technical requirements of reference (a) applies. This includes preservation of tanks, voids and underwater hull, otherwise referred to as critical coated areas. Critical coated areas are defined as areas that cannot be easily accessed and represerved without drydocking of the ship. Many of these areas are also monitored under the reference (b) inspection program. Ship's Force should not be conducting preservation of these areas unless addressed in this manual. FMAs who are supporting shipyard availabilities should utilize a trained workforce to accomplish work in critical coated areas and/or to complete preservation work associated with reference (b). The lead maintenance activity (shipyard, Regional Maintenance Center, Intermediate Maintenance Facility) executing the availability should promulgate to the FMA the qualifications required of personnel who can accomplish preservation in these areas. These qualifications shall meet the requirements of references (a) through (g) and be acceptable to the lead maintenance activity.

b. Occasionally tanks are entered for other reasons by the FMA or Ship's Force. National Association of Corrosion Engineers (NACE) Level I and Naval Sea Systems Command (NAVSEA) Paint Basic Inspector (NPBI) training does not instruct on how to inspect an in-service coating system. The Navy is implementing new training and requirements for "coating evaluators". If a tank is entered for any reason, it shall be inspected. If significant defects or paint failure is found, the Type Commander or shipyard shall be contacted. A Departure from Specification may need to be submitted to evaluate deferring repair to a future availability. If immediate repairs are needed, NAVSEA will provide the proper guidance.

7.1.2 Technical Point of Contact. Point of Contact for technical questions regarding this chapter is Karen Furrer, NAVSEA PMS392T122, (202) 781-4341. E-mail: karen.furrer@navy.mil.

7.2 SCOPE. This manual provides information to the FMA with basic step-by-step instructions for:

a. Inspecting and reporting areas of coating failure.

b. Providing oversight during the paint process.

c. Identifying the required surface preparation method.

d. Preparing the surface for repainting using hand or power tools.

e. Selecting proper paint(s) for a given application.

f. Becoming familiar with the Product Data Sheet (PDS) or American Society for Testing and Material (ASTM) F-718 sheet and Material Safety Data Sheet (MSDS) for a given paint.

g. Mixing and applying the paints.

h. Using a Wet Film Thickness (WFT) gauge to determine if the proper coating thickness was applied.

i. Knowing when to apply overcoats in a two (or more) coat system.

7.2.1 Ship's Force Responsibilities. This document assumes that Ship's Force personnel are being assisted by an FMA and:

a. Will apply all coatings using a brush or roller.

b. Will not be required to measure environmental conditions such as surface temperature, dew point and Relative Humidity (RH). Personnel should be instructed, during the training program established in Chapter 27, paragraph 27.3.2 of this Volume, that environmental conditions are important when painting and to consult a NACE or NPBI from the FMA if conditions are questionable.

c. Will not be required to measure surface salt contamination, but should be instructed, as part of the Chapter 27, paragraph 27.3.2 of this Volume, training, that excessive surface salt contamination will shorten the service life of a coating system and to consult a NACE or NPBI paint inspector from the FMA to determine if surface salt concentrations are within the acceptable range for paint application. Also ensures that the surface is washed with clean water.

d. Will not use spray equipment to apply paint.

e. Will not use abrasive blast or hydroblasting equipment to prepare the surface.

7.2.2 Fleet Maintenance Activity Responsibilities. This document assumes that the FMA:

a. Will maintain the tools needed by Ship's Force to accomplish the preservation process and instruct Ship's Force in their proper use.

b. Will maintain and be familiar with NACE or Society For Protective Coatings surface preparation and cleanliness standards (NACE Level 1 or NPBI inspectors).

c. Will assist Ship's Force in accomplishing inspections and prioritizing work.

d. Will maintain copies of reference (f), (VIS-2 Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces), to use when accomplishing inspections.

e. Will assist in the training of Ship's Force in the preservation process.

f. Will be onboard when painting operations are underway to monitor that the various steps of the process are being properly accomplished (NACE Level 1 or NPBI inspector).

g. Will perform spot checks of surface cleanliness, surface profile and WFTs during the coating process (NACE Level 1 or NPBI inspector).

h. Will monitor environmental conditions, temperature, humidity, dew point, to ensure they are within required limits during the coating process (NACE Level 1 or NPBI inspector).

i. Will conduct soluble salt testing when needed (NACE Level 1 or NPBI inspector).

j. Will advise Scheduled Preservation Upkeep Coordinated Effort (SPRUCE) Manager or ship's designated representative if required environmental conditions cannot be met (NACE Level 1 or NPBI inspector).

7.2.3 Quick Reference. A Quick Reference, section 7.10 of this chapter, provides concise steps for surface preparation and coating application in specific areas such as the sail and bilges as well as a "catch all" entitled "Miscellaneous Areas of General Corrosion". This manual is structured so that additional "Quick Reference" entries can be added as needed.

7.2.4 Scheduled Preservation Upkeep Coordinated Effort. The SPRUCE program has been established to ensure that internal and sail preservation is maintained at the highest possible level throughout the life of the ship. SPRUCE barge or FMA personnel are being trained as (NACE or NBPI) coating inspectors. They are a resource to Ship's Force during a SPRUCE availability, providing tools, consumables, services, required support personnel, as well as around the clock technical guidance and monitoring by a trained coating inspector. Ship's Force should seek guidance from SPRUCE barge or FMA personnel whenever they are uncertain about any phase of the surface preparation or coating application, but particularly in the following instances:

a. Measurement of environmental conditions (substrate surface temperature, dew point, relative humidity) to determine if painting may be conducted under the current conditions.

b. Measurement of surface salts. Painting over excess salt contamination is poor painting practice that may result in premature coating failure.

c. Information concerning specifications or requirements for coating systems.

7.3 GENERAL SAFETY PRECAUTIONS.

7.3.1 Hazards. Every painting assignment exposes maintenance personnel to conditions and situations that represent actual or potential danger to them and to others in the area. The frequent necessity to use toxic and flammable materials, pressurized equipment, ladders, scaffolding and rigging always presents a potential hazard. Hazards may also be inherent in the very nature of the environment or caused through ignorance or carelessness of the operator. It is, therefore, extremely important to be aware of all potential hazards, since continuous and automatic precautionary measures will minimize the problem and improve both efficiency and morale of the painting crew.

NOTE: THE PRECAUTIONS CONTAINED IN THIS MANUAL ARE IN ADDITION TO, AND DO NOT SUPERSEDE, OTHER SAFETY REQUIREMENTS THAT HAVE BEEN ESTABLISHED IN REFERENCE (d), SECTION D AND REFERENCE (e).

7.3.2 Precautions. This document highlights safety precautions for surface preparation and the mixing, handling and application of coatings. The local environmental, safety and health organization has cognizance over the safety precautions to be implemented during all phases of the painting process.

7.4 INSPECTION OF EXISTING PAINT AND BASE METAL.

7.4.1 Required Tools. The purpose of this section is to describe how to report the condition of the coating system in various ship areas. The inspector will need the following tools:

a. Flashlight.

b. Inspection mirror (to see hard-to-reach areas, such as behind beams).

c. Pocket knife.

e. Rag.

f. Paint stick/non-grease marker.

7.4.2 Failure Locations. Where practical, circle areas of failure with a paint stick/non-grease marker. Record location and type of failure on Appendix B. The following failure types should be reported:

7.4.2.1 Percent of General Corrosion. The extent of corrosion in the inspection area will determine how much surface preparation and painting is required. Therefore, the prime objective of the inspection is to accurately report the extent of corrosion. To facilitate accurate evaluation and reporting, reference (f) is available from the FMA and

shall be used. Reference (f), (VIS-2 Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces), is a series of photographs showing various extents of corrosion. To use the reference photos, examine the surfaces in the area being inspected and then select one of the reference photographs that most closely resembles the extent of rust in the area being inspected. Enter the percent on Appendix B in the column labeled, "Percent General Corrosion". If reference (f) is not available, estimate the amount of rust and indicate on the form that the standard was not used in the estimation.

7.4.2.2 Corrosion. After removing the corrosion scale with a scraper, look for structural steel defects such as visible metal loss, pitting or large corroded areas. If any defects are discovered, report findings to cognizant supervisor or hull survey team for further instructions and enter "Y" in column labeled, "Pitting Corrosion". Mark the pits with a paint stick/non-grease marker and make a note in the "Notes" column on Appendix B.

7.4.2.3 Percent of Blistering. Enter percentage of the total area showing blistering. Even though the pictorial representations contained in reference (f), (VIS-2 Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces), are intended for evaluating the degree of rusting, they can also be used as a guide in determining the percentage of an area that has blistered paint. Use the "General Rusting" diagrams (not the photographs) and select the diagram that most closely resembles the pattern of blistering in the area being inspected. Enter the percent on Appendix B in the column labeled "Percent Blistering". Work should be prioritized as follows:

a. Order of importance for type of failure: pitting > corrosion > blistering.

b. Order of importance for areas: pressure hull > non-pressure hull.

7.4.3 Cosmetic Paint Failure. Cosmetic paint failures may also be observed and should be repaired only after all other types of preservation failures have been repaired. Repeated cosmetic painting can cause excessive film build that will lead to premature paint failure. Stained or discolored paint should first be washed with detergent and lightly hand sanded to attempt to remove stains. If a cosmetic topcoat is applied, it should be applied in as thin a layer as possible to avoid excessive film build over time.

7.4.4 The Difference Between Rust and Rust Staining. It is necessary to know the difference between rust and rust staining. Dirt, residue or rust staining may be mistaken for rust. Stained, intact paint does not require removal and touch-up. Figures 1 and 2 show two photographs taken in the same location. The top photograph shows what may appear to be extensive rust, especially in a poorly lit area. However, the bottom photograph shows that, after rubbing a small circular area with a rag, the discoloration was caused by dirt and residue, not rusted metal.

Figure 1. Stained area before wiping a small area with a rag.

Figure 2. Stained area after wiping a small, circular area with a rag.

7.5 GENERAL SURFACE PREPARATION.

NOTE: POOR SUFACE PREPARATION IS THE CAUSE OF 95% OF COATING FAILURES. PREPARING THE SURFACE PROPERLY MAY WELL PREVENT RE-DOING THE SAME JOB.

7.5.1 Surface Cleaning Methods. The most important factor affecting the service performance of a coating is the degree of care taken in preparing the surface for painting. When scheduling surface preparation work, ensure that sufficient time will be available to paint all surfaces that have been prepared and allow the paint to fully cure before placing the surfaces into service. The goal of surface cleaning is to provide a roughened surface that is free of contamination and gouges or sharp projections. Roughening is necessary to attain the necessary anchor pattern for good paint adhesion. Surface cleaning methods vary with the type of surface preparation needed, location and size of the area being cleaned. These different cleaning methods are described in the following paragraphs. The steps required to prepare a surface for painting are:

a. Solvent cleaning to remove oil, grease, dirt, chemicals and water-soluble contaminants. If solvents are prohibited, use detergent and fresh water.

b. Mechanical cleaning (Hand Tool or Power Tool Cleaning) to remove rust and loose paint and to roughen or profile the surface for better coating adhesion.

c. Feathering edges.

d. Sweeping or vacuuming loosened material.

e. Solvent cleaning, if necessary. Check to see if oil was deposited on the surface during power tool cleaning.

f. Schedule paint application as soon as possible.

7.5.2 Solvent Cleaning. Solvent cleaning prepares surfaces by removing oil, grease, dirt and other foreign matter prior to mechanical cleaning or painting. The simplest procedure is to first remove soil and other dry material with a wire brush. The surface is then scrubbed with rags saturated with solvent. Clean rags are then used to rinse and wipe dry. Solvent cleaning shall be accomplished only when allowed by local air quality regulations. Recommended solvents: Super high-flash naphtha; Mineral spirits, NSN 010-00-558-7026 (alkyd paints). Surface preparation accomplished by solvent cleaning shall meet the requirements of reference (f), (SP-1 Solvent Cleaning).

7.5.3 Detergent Cleaning.

a. If solvent cleaning is prohibited, detergent cleaning may be substituted. A recommended detergent is MIL-D-16791, Type 1, Liquid Detergent. The procedure is:

(1) Mix detergent in fresh water according to packaging instructions.

(2) Wash substrate surface.

(3) Rinse with fresh water.

(4) Dry surface with clean dry rags to remove residual water.

b. Several non-specification cleaners such as Simple Green (produced by Sunshine makers, Inc.) have also been used successfully for smaller areas.

7.5.4 Hand Tool Cleaning.

a. Hand tools such as scrapers and wire brushes are used on surfaces in confined spaces (corners) that cannot be reached with power tools. Hand tool cleaning will remove only loose or loosely adhering surface contaminants, including rust scale, loose mill scale, loose rust and loosely adhering paint. Hand tool cleaning is not to be considered an appropriate procedure for removing tight mill scale and all traces of rust. It is primarily recommended for spot cleaning in areas where corrosion is not a serious factor. Surface preparation accomplished by hand tool cleaning shall meet the requirements of reference (f), (SP-2 Hand Tool Cleaning).

b. Before hand tool cleaning, the surface shall be free of oil, grease, dirt, chemicals and water-soluble contaminants, all of which may be removed with solvent cleaners and fresh-water rinsing. For small areas, clean dirt, soil, dust or other surface contaminants by using a detergent wash and freshwater rinse. Wipe the surface with rags or a stiff brush as necessary to remove any residue that does not wash off. Impact tools, such as chipping hammers, chisels or scalers shall be used to remove rust scale and any heavy buildup of old coatings. Start painting as soon as possible after cleaning.

c. In those situations where areas are not accessible to power tools, hand tool cleaning methods may have to be used. Since hand tool cleaning will remove only the loosest contamination, careful application of primers is required, preferably by brushing, to thoroughly wet the surface. To achieve satisfactory results, all applied coats shall be capable of overcoming the interference of contaminants left behind after hand tool cleaning.

7.5.5 Power Tool Cleaning.

7.5.5.1 Safety Warning. Before power tool cleaning, the surface shall be free of oil, grease, dirt, chemicals and water soluble contaminants, all of which may be removed with solvent cleaners and freshwater rinsing. Never try to remove oil or grease by the use of power tools. This causes the grease to become further imbedded in the metal surface, thus preventing good paint adhesion.

7.5.5.2 Power Tool Cleaning Procedure. The proper procedures for cleaning surfaces prior to the use of power tools are as follows:

a. For small areas, clean dirt, soil, dust or other surface contaminants by using a detergent wash and freshwater rinse. Wipe the surface with rags or a stiff brush as necessary to remove any residue that does not wash off.

b. To remove embedded grease, oil or soil from small areas, clean the surface with a clean cloth wetted with solvent. After final application of the solvent, wipe dry with a clean cloth.

c. Power tool cleaning will prepare surfaces faster and better than hand tool methods. Surface preparation acccomplished with power tools shall conform to the requirements of the Steel Structures Painting Council Surface Preparation Specification No. 11, “Power Tool Cleaning to Bare Metal”. Power tool cleaning to bare metal is defined as removal of all rust, loose mill scale and paint to bare metal (except for slight residue in pits if surface is pitted) by chipping, scraping, sanding or wire brushing. Power tools are used for removing small amounts of tightly adhering contaminants that hand tools cannot remove.

d. If oil residue is detected after power tool cleaning, solvent cleaning should be repeated.

e. Painting shall be started and completed as soon as possible after completion of power tool cleaning.

7.5.5.3 Types of Power Tools. Power tools are driven either electronically or pneumatically and the basic units include a variety of attachments. Chipping hammers are used to remove tight corrosion, mill scale and old paint from large metallic and masonary areas. Wire brushes (cup or radial) are used to remove loose mill scale old paint, weld flux, slag and dirt deposits. Grinders and sanders are used to smooth excessively rough surfaces. As with hand tools, care should be exercised with power impact and grinding tools so they do not remove metal or cut too deeply into the surface, resulting in burrs that are difficult to cover and protect satisfactorily. Care should be taken when using wire brushes and sanders to avoid polishing metal surfaces, which would prevent adequate adhesion of subsequent coatings.

7.5.5.4 Power Tool Allowance. The Master Allowance List, Part II, Group S92-1, contains the base allowances of power preservation tools for all ships. Changes in shipboard allowances may be implemented by direction of the Type Commanders. Common shipboard power tools are shown in Appendix C.

7.5.6 Feathering Edges. After mechanical cleaning (hand, power tool cleaning) is complete, edges of the intact paint surrounding the mechanically prepared area must be “feathered” into the metal. Feathering eliminates the “step” from the intact paint to bare metal. If this “step” is not removed, newly applied paint may crack as it dries leading to premature coating failure. The procedure for feathering an area of exposed metal surrounded by intact paint is as follows:

a. Lightly abrade the edges of intact paint with a power disk sander or rough sand paper.

b. Taper the edges to make a gradual transition from intact paint to bare metal so that the underlying coats are exposed at the edges.

c. Solvent (or detergent) clean.

d. Apply paint.

7.5.7 Aged Paint. Old paint in good condition is an excellent base for repainting. When a surface is to be repainted and the old paint is not to be removed, the surface must be roughened with abrasive and thoroughly cleaned and dried before new paint is applied. When only localized areas of spots require repainting, it is essential that the removal of the old paint be carried back around the edges of the spot or area until an area of completely intact and adhering paint film with no rust or blisters is attained. Edges of tightly adherent paint remaining around the area to be recoated must be "feathered". Painting should not be done over loose and cracked paint. When painted surfaces show evidence of corrosion, peeling, blistering, checking, scaling or general disintegration, remove the paint down to the bare surfaces.

7.5.8 Surface Salt Concentration. Coatings will fail prematurely if excess surface salts are not removed prior to coating application. Ship’s Force personnel are not expected to measure surface salt concentration. However, you are expected to know where to find qualified help (SPRUCE barge or Quality Assurance personnel (Code 340)) at TRIDENT Refit Facilities.

7.5.9 Equipment Maintenance. To assure the safe and proper operation of surface preparation equipment, the following are provided:

a. Power Tools.

(1) Ensure that no oil or grease is left exposed after completing maintenance work on surface preparation equipment. The slightest amount of oil or grease on the equipment will contaminate the surface and cause poor paint adhesion.

(2) Replace the disk on the disk sander when it no longer cuts through the paint film or when dirty. Replace the head of the wire brush unit when the wires are bent, worn, broken or frayed. Clean wires when dirty.

(3) Replace the head of the needle gun when over one-half of the needles become bent.

b. Hand Tools.

(1) Maintain a sharp and smooth edge on the scraper.

(2) Clean wire brush when dirty.

(3) Discard wire brush when wires become frayed or broken.

c. Care and Maintenance of Paint Brushes.

(1) Brushes that are to be reused the following day should be marked for white, light colors or dark colors.

(2) The weight of the brush should not rest on the bristles.

(3) Brushes not to be immediately reused should be cleaned with at least three washings of thinner or solvent, then washed with detergent and water.

(4) Brushes should be stored by suspending them from the handle on racks or wrapped in paper and stored flat.

(5) Paint rollers should be disposed.

7.6 GENERAL MIXING AND PAINT APPLICATION.

NOTE: PRIOR TO USING ANY PAINT, THE TWO FOLLOWING DOCUMENTS, ISSUED BY THE PAINT MANUFACTURER, SHOULD BE READ AND UNDERSTOOD.

7.6.1 Product Data Sheet/Material Safety Data Sheet. The PDS (or ASTM F-718 sheet) and MSDS provide the information to use the coating properly and safely. To obtain the PDS (or ASTM F-718 sheet) and MSDS, call the coating manufacturer and request them to FAX the PDS (or ASTM F-718 sheet) and MSDS. ASTM F-718s can also be obtained from the National Surface Treatment Center website, http://www.nstcenter.com. Some paint manufacturers may provide an ASTM F-718 sheet instead of a PDS. The use of ASTM F-718 sheets is preferred because they have been approved by NAVSEA. Both documents generally provide similar information.

7.6.1.1 Product Data Sheet. This document provides information about the proper use of the paint including:

a. Mixing instructions including mix ratio (for a two-part system).

b. Induction period (if required).

c. Application methods.

d. Pot life.

e. Drying and over coat times.

f. Wet and Dry Film Thickness (DFT) requirements.

7.6.1.2 Material Safety Data Sheet. This document provides information concerning safe use of the paint including the following sections:

a. Product identification.

b. Hazardous ingredients.

c. Physical data.

d. Fire and explosion data.

e. Health hazard data.

f. Reactivity data.

g. Spill or leak procedures.

h. Special protection information including Personal Protective Equipment (PPE).

i. Special precautions.

7.6.2 Mixing Area.

a. Shore Facilities.

(1) Painters should have detached shops or detached temporary structures where all paint should be mixed, and where paint buckets, brushes and rags can be temporarily stored.

(2) Only the quantity of paint needed for one day's work shall be taken into the mixing area.

b. Forces Afloat.

(1) Paint shall not be stowed in the mixing area.

(2) Mixing of paints and their solvents shall be confined to the paint mixing room or other designated compartment.

(3) Paint shall not be mixed aboard a submarine.

7.7 SPECIFIC PAINTING REGULATIONS FOR SUBMARINES.

7.7.1 Motor Generator Units. Prior to any interior painting, Positive Pressure Unit must be activated if the Motor Generator is not sealed or is open within five days of paint application. This will prevent solvent from damaging motor generators.

7.7.2 Coating Material.

a. Mix all paints BEFORE bringing it aboard the submarine. The use of paint pre-packaged in cartridge dispensing systems is encouraged because the paint is mixed in the static mixer as it is dispensed from the cartridge and open containers of paint are eliminated. MIL-DTL-24441 and VACTAN are currently the only paints that are used by Ship's Force available in cartridges.

b. With the exception of topside boot or other areas that do not vent to the submarine interior, all appreciable painting described in this document shall be completed at least five days prior to departure for sea. (The date of departure, as it relates to painting, shall be the date of the first dive after departure for a period of operation. The Commanding Officer of the submarine involved should determine the "date of departure" whenever the question arises.)

c. Bring onboard only the amount of paint than can be used in the immediate painting operation. The use of paint pre-packaged in cartridge dispensing systems is encouraged because a partially used cartridge can be capped and reused.

d. Where paint is applied to surfaces that later will be heated (e.g., thermal piping and lagging), the systems shall be activated (heated) prior to sealing the boat.

7.7.3 Items Not To Be Painted. The following surfaces are not to be painted and, therefore, should be masked off when paint is applied in the vicinity:

a. Corrosion Resistant Steel (CRES) on decks, CRES galley equipment and CRES bulkheads in wet spaces.

b. Decorative plastic surfaces such as on bulkheads or table tops.

c. Dogs and/or operating gear of watertight doors, hatches, scuttles and similar items.

d. Hatch and door rubber gaskets.

e. Labels (e.g., identification plates).

f. Insulators.

g. Knife edges of watertight doors and hatches.

h. Tiled areas.

i. Threaded parts, such as adjusting threads and take-up threads that, if painted, would not function properly.

j. Anodic and cathodic protectors (zincs).

k. Composition metal water ends of pumps.

l. Condenser heads and outside surfaces of condensers when of composition metal.

m. Exposed composition metal parts of any machinery.

n. Glands, stems, yokes, toggle gear and all machined external parts of valves.

o. Heat exchange surfaces of heating or cooling equipment.

p. Joint faces of gaskets and packing surfaces.

q. Lubricating gear, such as oil holes, oil or grease cups, lubricators and surfaces in contact with lubricating oil.

r. Lubricating oil reservoirs.

s. Charging water tanks.

t. De-mineralized water tanks.

u. Amine storage tanks.

v. Machined metal surfaces of reciprocating engines or pumps and all "oil wetted" surfaces of internal combustion engines.

w. Metal lagging.

x. Rods, gears, universal joints and couplings of valve operating gear.

y. Expansion joints, pipe hangers, flexible hose connections, items partially fabricated of rubber and rubber resilient elements of isolation mounts.

z. Springs.

aa. Strainers.

ab. Turbine casing joints, nuts and bolts.

ac. Working surfaces.

ad. Brass, bronze, gun metal and copper where used in submarine systems.

ae. Foundation bearing surfaces where alignment or sliding is required.

af. Electrical outlets, terminals, activating mechanisms of electrical safety devices, control switchboards on machinery elevators and grounding contact surfaces.

ag. Joints and contact surfaces of explosion-proof enclosures.

ah. The following interior surfaces (aluminum surfaces may be waxed where desired for appearance).

ai. Bins, shelves, dressers, drawers, cabinets, battens and fittings.

aj. Interior gratings, hand rails and floor plates.

ak. Internal surfaces of ventilation ducts.

al. Sight glasses, gauge faces or identification plates or other markings, which, if painted, would be illegible.

am. Faces of sonar transducers, hydrophones, no-foul rubber shelling, sonar dome rubber windows, rubber sonar domes and glass reinforced plastic domes.

an. Any other components or surfaces where the application of paint would affect the fit, form or function.

ao. When in doubt, contact the technical authority for guidance.

7.7.4 Shelf Life of Paints. Shelf life is the period after manufacture when the paint can be used. The date of manufacture is printed on the paint can. Refer to the PDS (or ASTM F-718 sheet) to determine the shelf life of the paint being used. Do not use paint that has passed the shelf life given on the PDS (or ASTM F-718 sheet). Partially used cartridges can be reused if the paint is still within the shelf life.

7.8 MIXING PROCEDURES.

7.8.1 Pre-Packaged Paint. The use of paint prepackaged in cartridge dispensing systems is encouraged because it eliminates mixing of paint. The cartridges may have to be shaken using a mechanical shaker designed for the cartridges. Cartridges are an alternative form of packaging and the dispensing system eliminates mixing. The properties of the paint remain the same with regard to WFT, spread rates, dry times, overcoat times, etc.

7.8.2 Mixing Observations. The following steps should be observed when mixing paint:

a. Prior to mixing paint, read and understand information in the manufacturer's PDS or ASTM F-718.

b. Mix all paints BEFORE bringing them aboard the submarine.

c. Paints should be thoroughly mixed (3 to 5 minutes with a mechanical mixer) and free of lumps, cakes and sediments prior to use. Multiple component paints require thorough mixing of each component before they are combined.

d. Mixing is best accomplished by the use of mechanical shakers or stirrers. Ground all mixing equipment shakers, stirrers, containers and platforms prior to use.

e. If a mechanical device is not available, a manual method, such as the boxing method, may be used. The boxing method is a manual paint mixing technique that is used in combination with manual stirring as described below:

(1) Pour the top two-thirds of the paint from the original can (#1) into a clean empty can (#2).

(2) Stir the pigment and liquid left in can #1 with a paddle until smooth.

(3) Gradually pour the paint in can #2 into can #1 while stirring.

(4) Pour the paint from can #1 into can #2. Reverse this step and repeat until the paint is uniformly smooth.

(5) If any particles do not dissolve after stirring and mixing, strain the paint through a wire screen or two layers of cheesecloth.

f. The following list of "DO NOTS" should be observed when mixing paints:

(1) DO NOT make any assumptions about the correct procedure for mixing paints. Consult the paint manufacturer's PDS or ASTM F-718 sheet.

(2) DO NOT mix more paint than can be used during the pot life time period. Read PDS (or ASTM F-718 sheet) for pot life.

(3) DO NOT mix components of different paint formulas.

(4) DO NOT use paint with large undissolved particles.

(5) DO NOT dilute paints with solvents (thinners).

(6) DO NOT keep epoxy paints out in the sun in warm weather, including epoxy paint pre-packaged in cartridges.

7.8.3 Mixing and Application Procedures for the Navy Epoxy Paint System. Navy epoxy Formula 150 is a primer coat that can be applied to bare metal or to sound paint. Topcoats of various colors (Formulas 151-156) are used for specific applications. Formula 151 is the gray color most commonly used. The following procedures should be followed in mixing these paints. Read and understand the manufacturer's current PDS or ASTM F-718 sheet.

a. The Navy epoxy paints are supplied in kits containing two components. One container is labeled Component A and the other is labeled Component B. These components are mixed in a 1:1 ratio by volume, i.e., for one gallon of component A add an equal amount of component B. Check the designation on both containers before mixing to ensure that the proper components are being used. The components of the various formula numbers are NOT interchangeable.

b. Both components in an epoxy paint kit must be stirred separately prior to mixing them together. After combining equal volumes of the two components, the mixture must be thoroughly stirred until well blended, and then allowed to react for the appropriate "induction" stand-in time as stated in the PDS (or ASTM F-718 sheet). Type IV does not require an induction period, but earlier formulations (Types I and III) require induction.

c. If an induction period is required, the paint should be stirred or agitated for at least 2 minutes every 30 minutes during the induction period. Two minutes of stirring or agitation are required at 4-hour intervals during the application process.

d. When Navy epoxy paints are used at a work site having temperatures in the range 35° to 50°F, it is essential that the paint components be pre-warmed to 70°F, mixed, and then allowed to stand for 2 hours prior to delivery to the work site. The preferred method of pre-warming is to store unmixed paint at 70°F for 24 hours prior to the job.

e. After being mixed, epoxy paints must be used within the pot life period, as specified in the PDS (or ASTM F-718 sheet).

f. During maintenance painting, brush application is recommended for the first coat of paint over mechanically cleaned surfaces such as hand-cleaned bilges. The brushing forces the paint into surface contaminants or displaces them. The MIL-P-24441 paints do not require thinning before application. Apply the topcoat(s) after the first coat has dried.

g. If more than seven days elapse before over coating, the surface should be cleaned with water and detergent (if required) for grease and oil removal. This should be followed by a fresh water rinse and wiped dry. Then, a tack coat (1 to 2 wet mils) of the last coat applied or Formula 150 is reapplied to the hard epoxy coat and allowed to dry approximately four hours before application of the next full coat of the system.

h. If more than 30 days elapse before over coating, clean and roughen the aged topcoat before new paint application.

7.8.4 Mixing and Application Procedures for Commercial Epoxy Paint Systems. Read and understand the manufacturer's current PDS or ASTM F-718 sheet. Specific items that vary depending on the coating manufacturer include:

a. Mix ratio. Mixing the two components in the proper ratio is absolutely vital.

b. Induction period. Refer to PDS (or ASTM F-718 sheet) for induction times.

c. Both components in an epoxy paint kit must be stirred separately prior to mixing them together. In short, there are several qualified commercial epoxy coating systems that are authorized for touch-up painting. They vary depending on the manufacturer. Follow instructions in the PDS or ASTM F-718 sheet for the particular coating being used.

7.9 PAINT APPLICATION.

7.9.1 General Considerations.

a. Inspect cleaned areas of the ship to determine the suitability of the surfaces for applicable touch-up or repainting operations. Surfaces shall be free of rust, deteriorated paint, dust, scale, oil, grease, salt deposits or other surface contaminants.

b. Do not paint over oily, damp or icy surfaces.

c. Never paint over loose, badly cracked or blistered paint. Old paint in good condition is an excellent base and should be cleaned, roughened and dried before repainting.

d. Under normal circumstances, the following environmental conditions apply:

(1) Surface temperature shall be at least 5^{o} F higher than the dew point.

(2) Paint should not be applied at temperatures of 35°F or lower; check the PDS or ASTM D-718 sheet for the low temperature application limit.

(3) Wind velocity should be below 15 miles per hour (exterior work).

(4) Relative humidity below 85 percent.

e. When successive coats of the same paint are used, different colors should be applied to visually facilitate complete coverage.

f. Apply paint as soon as possible after surface preparation has been completed. Bare metal surfaces will flash rust soon after exposure to the atmosphere.

g. When painting over a fully cured epoxy paint film, use a "tie coat" to ensure proper adhesion of the overcoat to the existing paint. A tie coat is a thin layer of paint (generally the same type of paint as the preceding coat) that is applied to the surface by brush or roller. The coat should be applied to a DFT of approximately 1 mil (2 mils WFT).

h. When painting over welds or in hard-to-get-at spaces that could not be cleaned to the proper surface cleanliness, brush on the first coat of paint to obtain the best adhesion. This comment applies to corners behind stiffeners or over weld seams. Hidden areas should be inspected with a pocket mirror to ensure total coverage before applying each succeeding coat and after the final coat.

i. Do not store paints and solvents inside submarines. Remove paint from the submarine when painting is completed or interrupted.

j. When replacing anodes, ensure that the area under the anode is adequately painted, but DO NOT PAINT THE ANODES themselves.

7.9.2 Brush Application. In larger areas, start work on overhead areas first, and then work downward. Begin painting at a corner or some other logical vertical division. Cover only that area which can be easily reached without moving ladders. Work downward, painting progressive sections to the deck level, then start at the top of the adjacent area and work down again. Paint trim, doors or similar areas after bulkheads and other major surfaces are completed.

a. Dip the brush into the paint up to ½ the bristle length. Withdraw the brush and tap it against the inside of the bucket to remove excess paint. Hold the brush at a 45^{o} angle to the surface to be painted. Make several light strokes in the area to be painted. This will transfer much of the paint to the surface. Then spread the paint evenly and uniformly. Do not bear down on the brush.

b. When using paint dispensing cartridges, apply a small amount to an area and spread evenly with a brush. It is better to start with a small amount and apply additional paint, than to dispense a large amount which may have to be spread into areas that were not prepared for painting.

c. When one section of the surface is painted, adjacent areas should be painted so that the brush strokes are completed by sweeping the brush into the wet edge of the paint previously applied. This helps eliminate lap marks and provides a more even coating.

d. Finally, cross-brush lightly to smooth the painted surface and to eliminate brush or sag marks. Very fast drying finishes will not permit much brushing and cross-lapping; in such cases, the paint shall be applied, spread rapidly and then allowed to dry undisturbed. Going back over a fast drying finish will cause piling up of the coating.

7.9.3 Roller Application. To apply paint with a roller, pour the premixed paint into the tray to about ½ tray depth. Immerse the roller and then roll it back and forth along the ramp to coat the roller cover completely. (A specially designed galvanized mesh screen positioned vertically in a 5-gallon bucket may be used instead of a paint tray.) The first load of paint should be worked out on a newspaper to remove trapped air from the roller cover. It is then ready to apply to a surface. Always roll paint onto the surface, working from the dry area into the area just painted. Never roll completely in the same direction. One good technique is to roll the paint onto the surface in a "W" pattern while

the roller is very wet. Distribute the paint using horizontal or vertical strokes. Pressure must be applied when rolling or the paint will not adhere and will soon peel off. Do not roll too fast. Avoid spinning the roller at the end of a stroke. Always feather out final strokes to pick up any excess paint on the surface. Feathering is done by rolling out the final stroke with minimal pressure. Paint from cartridge dispensing systems can be poured into trays for roller application.

NOTE: SPRUCE BARGE AND FMA PERSONNEL ARE TRAINED IN THE USE OF WFT GAUGES AND SHOULD BE CONSULTED FOR ASSISTANCE.

7.9.4 Wet Film Thickness Check. The performance of the coating depends on applying the proper thickness. The proper thickness, called DFT, is stated in the PDS or ASTM F-718 sheet. In order to obtain the proper DFT, WFT must be measured and controlled during application. The required WFT for a coating is stated in the PDS or ASTM F-718 sheet. A WFT gauge is used to measure the thickness of a coat of paint that is still wet to the touch. A typical wet film gauge (Figure 3) has several legs, with each of the inner legs (measuring legs) of varying known lengths and somewhat shorter than the two outer legs (support posts). When the gauge edge is pressed into the wet film (Figure 4), the two outer legs penetrate through the wet film to the substrate. Depending on the thickness of the wet film, some of the inner legs will dip into the wet film while others will not touch it. The length of longest inner leg that is wetted by the coating is the WFT (Figure 5). Proper use of the wet film gauge includes the following:

a. Measure WFT during coating application to determine if sufficient paint has been applied. The PDS or ASTM F-718 sheet will provide the required WFT.

b. Use the WFT gauge only on a flat surface. Both end legs must be firmly touching the steel surface.

(1) On a vertical surface, such as a bulkhead, hold the gauge in a north-south (vertical) position with the longer legs at the top.

(2) On a pipe, place the gauge along the length. Both legs must touch the surface.

c. Lift the gauge from the surface without sliding. Slipping and sliding will give an inaccurate reading because extra paint will be picked up on the legs.

d. Use only a clean, dry gauge. Clean the gauge after each reading. Dirt or old paint on the bottoms of the legs adds to their length giving lower readings.

Figure 3. Wet Film Thickness Gauge.

Figure 4. WFT Gauge Positioned in Wet Paint Film.

Figure 5. WFT Gauge Showing a Reading of 4-5 Mils.

1. Notice black paint on outer support posts and on measuring legs 1, 2, 3 and 4. No paint on measuring legs 5 and 6.
2. Wet film gauges may be purchased from:

   www.elcometer.com (From home page: "Film Thickness Gauge"; then "Wet Film Thickness".) Elcometer 154 Plastic Wet Film Combs may be an inexpensive option.

   Also, vendors from various coating companies often offer wet film gauges.

7.9.5 Overcoating. Most paint systems consist of more than one coat of paint. Proper steps for overcoating include the following:

a. Consult the PDS or ASTM F-718 sheet to determine the necessary "wait time" before overcoating.

b. Remember that the time before overcoating is dependent on the temperature. Generally, as the temperature increases, the time before overcoating decreases.

c. Remember - PDS (or ASTM F-718 sheet) guidance for time before overcoating is only an estimate.

d. Always check the applied coating before overcoating. If the applied coating is wet, allow more time.

e. Check the WFT using a WFT gauge (Paragraph 7.9.4 of this chapter).

7.10 QUICK REFERENCE SECTION.

7.10.1 Surface Preparation and Paint Application in Specific Areas. A summary of areas expected to be maintained by Ship's Force is shown in Table 1. Along with each area is a reference for surface preparation and the required coating system. For each area, a summary procedure is provided.

AREA	SURFACE PREP	COATING
Bilge	Paragraph 7.10.2.1	1 ct - F-150, Type IV (MIL-DTL-24441/29A) 1 ct - F-151, Type IV (MIL-DTL-24441/30A)
Sail (interior)	Paragraph 7.10.3.1	1 ct - F-150, Type IV (MIL-DTL-24441/29A) 1 ct - F-151, Type IV (MIL-DTL-24441/30A)
Non-skid (not tiled)	Paragraph 7.10.4.1.1	1 ct - primer (proprietary or F-150, Type IV) 1 ct - MIL-PRF-24667B non-skid
Non-skid (tiled)	Paragraph 7.10.4.2.1	2 cts - F-184 (MIL-DTL-24631/1C) 1 ct - F-187 (MIL-DTL-24631/7)
SHT-Topside, sail and rudder	Paragraphs 7.10.4.3.1 7.10.4.3.2	1 ct - F-187 (MIL-DTL-24631/7)
High temperature piping	Paragraph 7.10.5.1	TT-P-28G (Low VOC heat resisting aluminum)
Underway painting	Paragraph 7.10.6.3	VACTAN or UNITED 303 TRIUMPH
Miscellaneous areas of general corrosion (including high solids coatings)	Paragraph 7.10.7.1	1 ct - F-150, Type IV (MIL-DTL-24441/29A) 1 ct - F-151, Type IV (MIL-DTL-24441/30A)
Interior decks/walking surfaces	Section 7.5	1 ct - F-84 (TT-P-645B) 2 cts - MIL-PRF-24635C
Interior bulkheads/overheads	Section 7.5	1 ct - F-84 (TT-P-645B) 2 cts - F-124 (white), F-125 (pastel green), F-126 (bulkhead gray, F-131 (MIL-DTL-24607) OR 2 cts - F-25A (MIL-PRF-24596A)
Painting behind equipment (interior)	Section 7.5	2 cts - F-84 (TT-P-645B)
Exterior of motors, generators and electronic equipment	Section 7.5	1 ct - F-84 (TT-P-645B) 2 cts - F-111 (MIL-DTL-15090D)

Table 1. Summary of Areas for Touch-Up Painting by Ship's Force.

7.10.2 Bilges.

7.10.2.1 Surface Preparation.

a. Required Tools:

(1) Needle gun.

(2) Inspection mirror (for seeing hard-to-reach areas such as the backsides of beams).

(3) Brush and dust pan.

(4) Shop-Vac type vacuum cleaner.

b. Process:

(1) Read and understand Section 7.3 of this chapter, “General Safety Precautions”.

(2) Read and understand Section 7.5 of this chapter, “General Surface Preparation”.

(3) Solvent clean to remove oil, grease, dirt, chemicals and water-soluble contaminants. If solvents are prohibited, use detergent and fresh water. When implementing these procedures, work sections no larger than 6 feet by 6 feet (36 square feet) should be cleaned at a time. Longitudinal and transverse structural members can be used as boundaries to define the work section. Each section should be fully cleaned and primed before starting work on the next section.

(4) Use a needle gun to remove loose paint and rust. A needle gun is most effectively used by holding it 90^{o} to the surface, making 2-3 passes about 6-8 inches in length over the same path, then moving over and repeating the process until the entire area is completed. The goal is removal of all rust, loose mill scale and paint to bare metal.

(5) Feather the edges (Paragraph 7.9.3 of this chapter).

(6) Brush and vacuum loose pieces and dust.

(7) Check the surface for oil that may have been deposited during surface preparation. If necessary, solvent clean to remove oil. The presence of excess salts on the surface will cause premature coating failure. Therefore, surface conductivity measurements should be made at this point. Contact SPRUCE barge, FMA or other knowledgable personnel if help is needed. If excessive surface conductivity is measured, wash the area with fresh water and repeat Step (7).

(8) Apply paint as soon as possible (ideally, the same day) after surface preparation has been completed. Bare metal surfaces will flash rust soon after exposure to the atmosphere. If flash rusting occurs prior to coating application, repeat Steps (3)-(8).

7.10.2.2 Paint Application. Prior to any interior painting, Positive Pressure Unit must be activated. This will prevent solvent from damaging Motor Generators.

a. Required Tools:

(1) Rollers.

(2) Brushes.

(3) Rags.

(4) Manufacturer’s PDS or ASTM F-718 sheet for the following paints:

(a) Formula 150, Type IV (MIL-DTL-24441, Formula 150, Type IV, green primer).

(b) Formula 151, Type IV (MIL-DTL-24441, Formula 151, Type IV, haze gray).

(5) Manufacturer’s MSDS for the following paints:

(a) Formula 150, Type IV, Component A (MIL-DTL-24441, Formula 150, Type IV, green primer, component A).

(b) Formula 150, Type IV, Component B (MIL-DTL-24441, Formula 150, Type IV, green primer, component B).

(c) Formula 151, Type IV, Component A (MIL-DTL-24441, Formula 151, Type IV, haze gray, component A).

(d) Formula 151, Type IV, Component B (MIL-DTL-24441, Formula 151, Type IV, haze gray, component B).

b. Process:

(1) Read and understand Section 7.6 of this chapter, "General Mixing and Paint application".

(2) Read and understand the PDS (or ASTM F-718 sheet) and MSDS for the two paint systems to be used.

(a) F-150, Type IV, green primer and F-151.

(b) Type IV, haze gray top coat.

(3) Ensure proper ventilation is in place. Maintain ventilation through the curing of the applied coatings.

(4) Check environmental conditions. Ask for help from SPRUCE barge or FMA personnel.

(5) Surface temperature shall be at least 5°F higher than the dew point.

(6) Paint shall not be applied at temperatures of 35°F or lower.

(7) Relative humidity shall be below 85 percent.

(8) Mix F-150, Type IV, green primer according to manufacturer's instructions. Mix ratio is 1:1 by volume. (Paragraph 7.8.3 of this chapter, Mixing and Application Procedures for the Navy Epoxy Paint System (MIL-DTL-24441)).

7.10.2.3 Summary. Table 2 summarizes mixing, application and re-coat parameters.

Paint	Induction Period (hours)	Mix Ratio (volume)	Pot Life (hours)	Time Before Overcoating (hours)	Time to Handle (hours)	Wet Film Thickness (mils)	Dry Film Thickness (mils)
F-150, green primer	N/A	1 : 1	6 @ 70°F	Minimim of 3 @ 40°F 3 @ 70°F @ 50% RH	Minimum of 24 @ 40°F 5 @ 70°F @ 50% RH	6-7	4-5
F-151, gray topcoat	N/A	1 : 1	6 @ 70°F	Minimim of 3 @ 40° F 3 @ 70° F @ 50% RH	Minimum of 24 @ 40°F 5 @ 70°F @ 50% RH	6-7	4-5

Table 2. Mixing, Application and Re-Coat Parameters for Bilges.

a. Apply by brush. Be certain to force coating into corners, behind beams and areas that are difficult to reach. Pay particular attention to newly installed components such as pipe hangers and clamps. (Paragraph 7.9.2 of this chapter, "Brush Application")

b. Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter).

c. Wait until the first coat is dry, a minimum of 3 hours, before overcoating. If, after 3 hours, coating is not dry, check hourly by pressing thumbnail into surface. Coating is dry when thumbnail does not penetrate.

d. When first coat is dry, apply a "stripe" coat on welds, corners and edges. The "stripe" coat should be a different color than either the first coat (green) or the topcoat (gray) to facilitate coverage. F-153, Type IV, a black coating, is a good choice. If a different color is not available, use F-151, Type IV, gray as the "stripe" coat.

e. When the "stripe" coat is adequately dry, mix F-151, Type IV, gray topcoat according to manufacturer's instructions. Mix ratio is 1:1 by volume. (Paragraph 7.8.3 of this chapter, Mixing and Application Procedures for the Navy Epoxy Paint System (MIL-DTL-24441.)

f. Apply by brush or roller if a roller can reach all areas that need paint. (Paragraph 7.9.2 of this chapter, "Brush Application"; Paragraph 7.9.3 of this chapter "Roller Application".) If F-151 was used as the "stripe" coat, pay particular attention to completely cover the "stripe" coat since there is no color difference to provide visual contrast.

g. Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter).

h. Freshly painted areas should be roped off to prevent contamination during the curing process. Allow coating to cure per the curing schedule given in the PDS (or ASTM F-718 sheet).

i. Ventilation should be in place during the curing process as it will facilitate curing and prevent build-up of hazardous vapors.

7.10.3 Sail (Interior).

7.10.3.1 Surface Preparation.

a. Required Tools:

(1) Needle gun.

(2) Long-handled paint scraper.

(3) Coarse sand paper.

(4) Inspection mirror (for seeing hard-to-reach areas such as the backsides of beams).

(5) Brush and dust pan.

(6) Shop-Vac type vacuum cleaner.

b. Process:

(1) Read and understand Section 7.5 of this chapter, "General Surface Preparation".

(2) Solvent clean to remove oil, grease, dirt, chemicals and water-soluble contaminants. If solvents are prohibited, use detergent and fresh water.

(3) Use the long-handled scraper to remove any areas of exfoliated metal. Because many areas in the sail are difficult to preserve, advanced corosion, including exfoliation may occur. In the periscope bay, the bulkhead just forward of the bearing frame is a typical area. Exfoliation is the "delamination" of metal into layers. All exfoliated layers must be removed by scraping them off.

(4) Starting at the top of a bay and working to the bottom, use a needle gun to remove loose rust and paint. A needle gun is most effectively used by holding it 90^{o} to the surface, making 2-3 passes about 6-8 inches in length over the same path, then moving over and repeating the process until the entire area is completed. The goal is removal of all rust, loose mill scale and paint to bare metal. In areas not accessible by needle gun, use scrapers followed by coarse sand paper. Feather the edges.

(5) When needle gunning and sanding are complete, brush and vacuum loose pieces and dust from the area. Be sure to get "shelves" and "throughs" and other "collection points".

(6) Check the surface for oil that may have been deposited during surface preparation. If necessary, solvent clean to remove oil.

(7) The presence of excess salts on the surface will cause premature coating failure. Therefore, surface conductivity measurements should be made at this point (Paragraph 7.5.8 of this chapter) if the area is exposed to seawater. Contact SPRUCE barge, FMA or other knowledgable personnel if help is needed. If excessive surface conductivity is measured, wash the area with fresh water and repeat the step.

(8) Apply paint as soon as possible (ideally, the same day) after surface preparation has been completed. Bare metal surfaces will flash rust soon after exposure to the atmosphere. If flash rusting occurs prior to coating application, repeat Steps (5)-(8).

7.10.3.2 Paint Application.

a. Required Tools:

(1) Rollers.

(2) Brushes.

(3) Rags.

(4) WFT gauge.

(5) Manufacturer's PDS or ASTM F-718 sheet for the following paints:

(a) Formula 150, Type IV (MIL-DTL-24441, Formula 150, Type IV, green primer).

(b) Formula 151, Type IV (MIL-DTL-24441, Formula 151, Type IV, haze gray).

(6) Manufacturer's MSDS for the following paints:

(a) Formula 150, Type IV, Component A (MIL-DTL-24441, Formula 150, Type IV, green primer, component A).

(b) Formula 150, Type IV, Component B (MIL-DTL-24441, Formula 150, Type IV, green primer, component B).

(c) Formula 151, Type IV, Component A (MIL-DTL-24441, Formula 151, Type IV, haze gray, component A).

(d) Formula 151, Type IV, Component B (MIL-DTL-24441, Formula 151, Type IV, haze gray, component B).

b. Process:

(1) Read and understand Section 7.6 of this chapter, "General Mixing and Paint Application".

(2) Read and understand the PDS (or ASTM F-718 sheet) and MSDS for the two paint systems to be used.

(a) F-150, Type IV, green primer.

(b) F-151, Type IV, haze gray top coat.

(3) Check environmental conditions. Ask for help from SPRUCE barge or FMA personnel.

(a) Surface temperature shall be at least 5°F higher than the dew point.

(b) Paint shall not be applied at temperatures of 35°F or lower.

(c) Relative humidity shall be below 85 percent.

(4) Mix F-150, Type IV, green primer according to manufacturer's instructions. Mix ratio is 1:1 by volume. (Paragraph 7.8.4 of this chapter, Mixing and Application Procedures for the Navy Epoxy Paint System (MIL-DTL-24441)).

c. Summary.

Table 3 summarizes mixing, application and overcoat parameters.

Paint	Induction Period (hours)	Mix Ratio (volume)	Pot Life (hours)	Time Before Overcoating (hours)	Time to Handle (hours)	Wet Film Thickness (mils)	Dry Film Thickness (mils)
F-150, green primer	N/A	1 : 1	6 @ 70°F	Minimim of 3 @ 40°F 3 @ 70°F @ 50% RH	Minimum of 24 @ 40°F 5 @ 70°F @ 50% RH	6-7	4-5
F-151, gray topcoat	N/A	1 : 1	6 @ 70°F	Minimim of 3 @ 40°F 3 @ 70°F @ 50% RH	Minimum of 24 @ 40°F 5 @ 70°F @ 50% RH	6-7	4-5

Table 3. Mixing, Application and Overcoat Parameters for Sail (Interior).

(1) Apply by brush. Be certain to force coating into corners, behind beams and areas that are difficult to reach. (Paragraph 7.9.2 of this chapter, "Brush Application".)

(2) Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter). Wait until the first coat is dry, a minimum of 3 hours, before overcoating. If, after 3 hours, coating is not dry, check hourly until coating is dry. REMEMBER - PDS (or ASTM F-718 sheet) and Table 3 guidance for overcoating interval is an estimate. You must be able to walk on the first coat without damaging it.

(3) When first coat is dry, apply a "stripe" coat on welds, corners and edges. The "stripe" coat should be a different color than either the first coat (green) or the topcoat (gray) to facilitate coverage. F-153, Type IV, a black coating, is a good choice. If a different color is not available, use F-151, Type IV, gray as the "stripe" coat.

(4) When the "stripe" coat is adequately dry, mix F-151, Type IV, gray topcoat according to manufacturer's instructions. Mix ratio is 1:1 by volume. (Paragraph 7.8.3 of this chapter, Mixing and Application Procedures for the Navy Epoxy Paint System (MIL-DTL-24441)).

(5) Apply by brush or roller (if a roller can reach all areas that need paint). (Paragraph 7.9.2 of this chapter, "Brush Application"; Section 7.9.3 of this chapter "Roller Application".) If F-151 was used as the "stripe" coat, pay particular attention to completely cover the "stripe" coat since there is no color difference to provide visual contrast.

(6) Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter). Freshly painted areas should be roped off to prevent contamination during the curing process.

(7) Allow coating to cure per the curing schedule given in the PDS (or ASTM F-718 sheet). Ventilation should be in place during the curing process as it will facilitate curing and prevent build-up of hazardous vapors.

7.10.4 Non-Skid Areas.

7.10.4.1 Areas That Are Not Tiled With Special Hull Treatment. Non-skid paints are not to be applied to hatch covers, Submarine Rescue Diving Recompression System seating surfaces, safety tracks, life line sockets, deck fittings and gear, faying surfaces of hatches, contact or bearing surfaces, and approximately 1 inch around the periphery of hatches, cleats and access covers.

7.10.4.1.1 Surface Preparation.

a. Required Tools:

(1) Dull putty knife.

(2) Needle gun.

(3) Brush and dust pan.

(4) Shop-Vac type vacuum cleaner.

b. Process:

(1) Read and understand Section 7.5 of this chapter, "General Surface Preparation".

(2) When a coating failure is detected, the area shall be probed with a dull putty knife or similar instrument, to determine the extent of failure. Once the failure area is identified, the area to be repaired shall extend slightly (at least 3 inches) outside the perimeter of the failing area to ensure the problem is corrected.

(3) Clean the surface by removing foreign matter such as oil, grease, dirt and other contaminants. Solvent cleaning is recommended. If solvent cleaning is not permitted, use a commercial cleaner, such as Simple Green or Spray 9. Use only clean, white, lint-free rags and change rags often.

(4) Use a needle gun to remove all loose paint and rust from the failed area. A needle gun is most effectively used by holding it 90^{o} to the surface, making 2-3 passes about 6-8 inches in length over the same path, then moving over and repeating the process until the entire area is completed. The goal is removal of all rust, loose mill scale and paint to bare metal.

(5) Feather the edges.

(6) When needle gunning and sanding are complete, brush and vacuum loose pieces and dust from the area. Again, clean the surface. Solvent cleaning is recommended. If solvent cleaning is not permitted, use a commercial cleaner, such as Simple Green or Spray 9. Use only clean, white, lint-free rags and change rags often.

(7) The presence of excess salts on the surface can cause premature coating failure. Therefore, surface conductivity measurements should be made at this point. Contact SPRUCE barge or FMA personnel if help is needed.

(8) Apply paint as soon as possible (ideally, the same day) after surface preparation has been completed.

7.10.4.1.2 Paint Application.

a. Required Tools:

(1) Rollers.

(2) Brushes.

(3) Rags.

(4) WFT gauge.

(5) Manufacturer's PDS or ASTM F-718 sheet for the MIL-C-24667 non-skid paint system.

(6) Manufacturer's MSDS for the MIL-C-24667 non-skid paint system.

b. Process:

NOTE: THE USE OF F-150 (MIL-DTL-24441) PRIMER IS PROHIBITED UNLESS A NON-SKID SYSTEM HAS BEEN QUALIFIED WITH A SPECIFIC MANUFACTURER'S F-150 AS A PRIMER.

(1) Read and understand the PDS (or ASTM F-718 sheet) and MSDS for the non-skid paint systems. Most non-skid systems require a primer system. If a primer is required, check with the manufacturer to determine if MIL-DTL-24441, Formula 150, Type IV, green primer is authorized. The qualified products list of the specification being used shall be consulted to determine if a particular Formula 150 can be used as a primer. SPRUCE barge or FMA personnel can provide this information.

(2) Check environmental conditions. Ask for help from SPRUCE barge or FMA personnel.

(a) Surface temperature shall be at least 5°F higher than the dew point.

(b) Paint shall not be applied at temperatures of 50°F or lower.

(c) Relative humidity shall be below 85 percent.

(3) Mix the primer according to manufacturer's instructions. Be sure to check for an induction period. If an induction period is required, mix for one minute after induction. If F-150 is authorized and is being used as a primer, see Paragraph 7.8.3 of this chapter (Mixing and Application Procedures for the Navy Epoxy Paint System (MIL-DTL-24441)).

(4) Apply primer by brush or roller. (Paragraphs 7.9.2, "Brush Application" and 7.9.3 "Roller Application" of this chapter.)

(5) Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter).

(6) Wait until the primer coat is dry before mixing the MIL-C-24667 non-skid coating system. Thoroughly mix the base material of the non-skid using the type of mixer specified in the manufacturer's ASTM F-718 sheets. Make sure that all materials which may have settled during storage (pigments, fillers, aggregate) are lifted from the bottom of the container and are uniformly mixed. Slowly pour the contents of the can of converter (also called hardener, accelerator or curing agent) into the base material. Scrape the bottom of the base material can. Mix converter and base material for 3 to 5 minutes or until uniform color and appearance. Scrape the bottom of the can and mix again for 3 to 5 minutes. If an induction period is required, stir again for one minute after the induction period. Thinning non-skid is strictly prohibited.

(7) Apply by roller or trowel. If a a roller is used, roll across (not along) welds. Cross-rolling shall extend 3 to 6 inches on each side of the weld. If troweling, consult the manufacturer's PDS (or ASTM F-718 sheet) for recommended trowel size.

(8) Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter).

(9) Freshly painted areas should be roped off to prevent contamination during the curing process.

(10) Allow coating to cure per the curing schedule given in the PDS (or ASTM F-718 sheet).

(11) Ventilation should be in place during the curing process as it will facilitate curing and prevent build-up of hazardous vapors.

7.10.4.2 Special Hull Treatment Tiled Areas (Non-Skid). Non-skid paints are not to be applied to hatch covers, Submarine Rescue Diving Recompression System seating surfaces, safety tracks, life line sockets, deck fittings and gear, faying surfaces of hatches, contact or bearing surfaces and approximately one inch around the periphery of hatches, cleats and access covers.

7.10.4.2.1 Surface Preparation.

a. Required Tools:

(1) 80-100 grit aluminum oxide paper.

(2) Shop-Vac type vacuum cleaner.

(3) Manufacturer's MSDS for PF-145 HP solvent.

b. Process:

(1) Read and understand Section 7.3 of this chapter, "General Safety Precautions".

(2) Read and understand Section 7.5 of this chapter, "General Surface Preparation".

(3) Clean the surface of any grease, oil, salt or other residue with a detergent solution and rinse with fresh water.

CAUTION: THE COVERPLY OF THE TILES CONTAINS APPROXIMATELY 10% BY WEIGHT LEAD OXIDE, AN ADDITIVE USED TO CONTROL THE RATE OF WATER ABSORPTION BY THE TILES. WHENEVER SANDING OR GRINDING TILE SURFACES, BE CERTAIN TO WEAR PROPER PPE.

(4) Hand sand the surface using 80-100 grit aluminum oxide paper to roughen the surface of the tiles for better adhesion. Be sure to remove all old paint in the touch-up area.

(5) Vacuum up dust.

(6) Clean surface of remaining dust by wiping with PF-145 HP solvent poured directly onto a clean rag. Do not dip the rag into the solvent. Change rags frequently.

(7) Apply paint as soon as possible (ideally, the same day) after surface preparation has been completed.

7.10.4.2.2 Paint Application.

a. Required Tools:

(1) Short nap rollers.

(2) Brushes.

(3) Rags.

(4) Manufacturer's PDS or ASTM F-718 sheet for MIL-A-22262 abrasive grit material.

(5) Manufacturer's PDS or ASTM F-718 sheet for the following paints:

(a) Formula 184 (black flexible epoxy).

(b) Formula 187 (black polyurethane camouflage).

(6) Manufacturer's MSDS for the following paints:

(a) Formula 184, Component A (black camouflage epoxy).

(b) Formula 184, Component B (black camouflage epoxy).

(c) Formula 187, Component A (black polyurethane camouflage).

(d) Formula 187, Component B (black polyurethane camouflage).

b. Process:

(1) Read and understand Section 7.8 of this chapter, "General Mixing and Paint application".

(2) Read and understand the PDS (or ASTM F-718 sheet) and MSDS for the Formula 184 and Formula 187 paint systems.

(3) Check environmental conditions. Ask for help from SPRUCE barge or FMA personnel.

(a) Surface temperature shall be at least 5°F higher than the dew point.

(b) Paint shall not be applied at temperatures of 50°F or lower.

(c) Relative humidity shall be below 75 percent.

CAUTION: MIXING SHOULD BE PERFORMED AT A TEMPERATURE OF 50°F OR ABOVE.

(4) Thoroughly mix the A and B components of Formula 184 (black epoxy) in their individual containers by hand stirring. Mix the A and B components together in a 1:1 ratio by volume.

c. Summary.

(1) Table 4 summarizes mixing, application and overcoat parameters.

Paint	Induction Period (minutes)	Mix Ratio (volume)	Pot Life (hours)	Time Before Overcoating (hours)	Time to Handle (hours)	Wet Film Thickness (mils)	Dry Film Thickness (mils)
F-184, black epoxy camouflage	30 @ 70-90°F 45 @ 55-70° F	1 : 1 (Mix at 50° or above)	2 (maximum)	6 hours (minimum) - 6 months	24 (maximum)	8 - 9	4 -5
F-187, black polyurethane camouflage	None	4 : 1 (Mix at 50° or above)	1 (minimum)	18 hours - 7 days	18 (maximum)	4-5	3

Table 4. Mixing, Application and Overcoat Parameters for Non-Skid Areas.

(2) Apply the F-184 paint in a smooth uniform layer using a paint brush or roller. (Paragraphs 7.9.2, "Brush Application" and 7.9.3 "Roller Application" of this chapter.) Due to difficulty in removing old paint from depressed tile seam areas, "stripe" these areas with a wide brush prior to roller application.

(3) Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter). WFT should be 8-9 mils.

(4) While the epoxy paint is still wet, sprinkle the abrasive grit material onto the freshly painted film to achieve a uniform roughness over the entire area.

(5) When the first coat is dry, apply a second coat of Formula 184 black epoxy paint.

(6) When the second coat of Formula 184 black epoxy is dried, a sealer coat of Formula 187 polyurethane paint must be applied.

(7) Mix the A and B components of the Formula 187 black polyurethane paint together in a 4:1 ratio by volume. Mix entire gallon of A with entire quart of B. The mixture should be thoroughly blended for two minutes after which it can be used immediately. (There is no induction time for the polyurethane paint.)

(8) Due to difficulty in removing old paint from depressed tile seam areas, "stripe" these areas with a wide brush prior to roller application.

(9) Apply the F-187 paint in a smooth uniform layer using a paint brush or roller. (Paragraphs 7.9.2, "Brush Application" and 7.9.3 "Roller Application" of this chapter.)

(10) Allow 24 hours for paint to cure before permitting foot traffic. Freshly painted areas should be roped off to prevent contamination of the coating.

(11) Paint should cure for a minimum of 5 days prior to submerging.

7.10.4.3 Special Hull Treatement Tiles - Topside, Sail and Rudder. Due to poor performance of epoxy camouflage paint (Formula 184, old DTRC 2844-1118 formula) when exposed to sunlight, Formula 187, a non-fading polyurethane camouflage paint is used in areas exposed to sunlight, i.e., topside, sail and rudder. This paint is expected to retain its black color for at least two years. It is therefore NOT recommended to recoat the urethane camouflage for at least two years after application. Within the first two years, only cleaning is recommended. Reference (g) clearly identifies the potential lead hazard associated with Special Hull Treatment (SHT) work and outlines procedures necessary to mitigate this hazard when preparing exterior submarine surfaces for repainting.

7.10.4.3.1 Cleaning of Formula 187 Urethane Camouflage Coating.

a. Required Tools: "Greenie pads".

b. Process:

(1) Apply fresh water from firehose or other source to dirty SHT surfaces.

(2) Lightly scour the surface with a damp “Greenie Pad” or other similar material to loosen dirt and debris.

(3) Hose down surface with fresh water to restore original black color.

NOTE: AFTER TWO YEARS OF SERVICE OR SIGNIFICANT MECHANICAL DAMAGE, FORMULA 187 MAY BE TOUCHED UP.

7.10.4.3.2 Surface Preparation.

a. Required Tools:

(1) 80-100 grit aluminum oxide paper.

(2) Shop-Vac type vacuum cleaner.

(3) Manufacturer’s MSDS for PF-145 HP solvent.

b. Process:

(1) Read and understand Section 7.3 of this chapter, “General Safety Precautions”.

(2) Read and understand Section 7.5 of this chapter, “General Surface Preparation”.

(3) Clean the surface of any grease, oil, salt or other residue with a detergent solution and rinse with fresh water.

(4) In accordance with reference (c), Ship’s Force should only remove paint when required to accomplish preservation of corroded surfaces or when bare metal is necessary for an inspection or welding. SHT tiles on 688 Class submarines contain 10 percent lead by weight. The generation of airborne SHT dust may have an adverse effect on worker health and contaminate the surrounding environment. In the case where removal of SHT coverply paint is authorized, special work controls must be followed to ensure appropriate worker protection and prevent environmental contamination.

(5) Hand sand the surface using 80-100 grit aluminum oxide paper to roughen the surface for adhesion. Polyurethane will not adhere to itself unless the previous coat has been sanded.

(6) Vacuum up dust.

(7) Clean surface of remaining dust by wiping with PF-145 HP solvent poured directly onto a clean rag. Do not dip the rag into the solvent. Change rags frequently.

(8) Apply paint as soon as possible (ideally, the same day) after surface preparation has been completed.

7.10.4.3.3 Paint Application.

a. Required Tools:

(1) Short nap rollers.

(2) Brushes.

(3) Rags.

(4) Manufacturer’s PDS or ASTM F-718 sheet for Formula 187, (black polyurethane camouflage).

(5) Manufacturer’s MSDS for the following paints:

(a) Formula 187, Component A (black polyurethane camouflage).

(b) Formula 187, Component B (black polyurethane camouflage).

b. Process:

(1) Read and understand Section 7.6 of this chapter, “General Mixing and Paint Application”.

(2) Read and understand the PDS (or ASTM F-718 sheet) and MSDS for the F-187 paint system.

(3) Check environmental conditions. Ask for help from SPRUCE barge or FMA personnel.

(a) Surface temperature shall be at least 5°F higher than the dew point.

(b) Paint shall not be applied at temperatures of 50°F or lower.

(c) Relative humidity shall be below 75 percent.

c. Summary.

(1) Table 5 summarizes mixing, application and overcoat parameters.

Paint	Induction Period (hours)	Mix Ratio (volume)	Pot Life (hours)	Time Before Overcoating (hours)	Time to Handle (hours)	Wet Film Thickness (mils)	Dry Film Thickness (mils)
F-187, black polyurethane camouflage	None	4 : 1 (Mix at 50^{o} or above)	At least 1	18 hours - 7 days	At least 2	4-5	3

Table 5. Mixing, Application and Overcoat Parameters for Special Hull Treatment Tiles.

CAUTION: MIXING SHOULD BE PERFORMED AT A TEMPERATURE OF 50^{O} F OR ABOVE.

(2) Thoroughly mix the A and B components in their individual containers by hand stirring. Mix the A and B components together in a 4:1 ratio by volume. Mix entire gallon of A with entire quart of B. The mixture should be thoroughly blended for two minutes after which it can be used immediately. (There is no induction time for the polyurethane paint.)

(3) Due to difficulty in removing old paint from depressed tile seam areas, “stripe” these areas with a wide brush prior to roller application.

(4) Apply the F-187 paint in a smooth uniform layer using a paint brush or roller. (Paragraphs 7.9.2, “Brush Application” and 7.9.3 “Roller Application” of this chapter.)

(5) Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter). WFT should be 4-5 mils.

(6) Allow 24 hours for paint to cure before permitting foot traffic. Freshly painted areas should be roped off to prevent contamination of the coating. Paint should cure for a minimum of 5 days prior to submerging.

7.10.5 High Temperature Piping (and Components Near the 12k Evaporator).

a. To minimize corrosion of carbon steel piping and other components in the vicinity of the 12k evaporator it is important to reduce the accumulation of salt on the surfaces and ensure the heat-resistant paint is applied at the recommended film thickness.

b. When paint repairs are conducted on high temperature piping or other components in the vicinity of the 12k evaporator, the evaporator MUST NOT BE OPERATING (cool).

7.10.5.1 Surface Preparation.

a. Required Tools:

(1) 180 grit sand paper.

(2) Shop-Vac type vacuum cleaner.

(3) Manufacturer’s MSDS for mineral spirits, TT-T-291.

b. Process:

(1) Read and understand Section 7.5 of this chapter, “General Surface Preparation”.

(2) Wash the area to be painted with deionized water. This step removes excess salt.

(3) Clean with an approved solvent (mineral spirits, TT-T-291, NSN 8010-00-558-7026) to remove oil and grease.

(4) Remove any loosely adherent paint and rust with a wire brush.

(5) Lightly abrade with 180-grit sandpaper. Take care to minimize the amount of steel removed. Ensure any residual dust from sanding is removed.

(6) Wash the area again with deionized water.

(7) Dry the area and check surface for surface salt concentration. SPRUCE personnel are trained in the measurement of surface salt contamination. If required, consult the SPRUCE barge or FMA personnel for help. If the salt concentration limit is exceeded, wash the area again with fresh water. Pay particular attention to crevices, pits and welds. Dry affected area and measure soluble salt level again to verify that salt concentration is below the maximum level. Repeat this step until soluble salt levels are acceptable.

(8) Apply paint immediately after the surface has been prepared to prevent re-contamination.

7.10.5.2 Paint Application.

NOTE: PRIOR TO ANY INTERIOR PAINTING, POSITIVE PRESSURE UNIT MUST BE ACTIVATED. THIS WILL PREVENT SOLVENT FROM DAMAGING MOTOR GENERATORS.

a. Required Tools:

(1) Rollers.

(2) Brushes.

(3) Rags.

(4) WFT gauge.

(5) Manufacturer’s PDS or ASTM F-718 sheet for TT-P-28G (Low VOC heat resisting aluminum).

(6) Manufacturer’s MSDS for TT-P-28G (Low VOC heat resisting aluminum).

CAUTION: HEAT RESISTANT PAINT IS EXTREMELY FLAMMABLE AND SHOULD NOT BE APPLIED AT TEMPERATURES ABOVE 85 °F.

b. Process:

(1) Read and understand Section 7.3 of this chapter, “General Safety Precautions”.

(2) Read and understand Section 7.6 of this chapter, “General Mixing and Paint application”.

(3) Read and understand the PDS (or ASTM F-718 sheet) and MSDS for the TT-P-28G paint systems.

(4) Check environmental conditions. Ask for help from SPRUCE barge or FMA personnel.

(a) Surface temperature shall be at least 5°F higher than the dew point.

(b) Paint shall not be applied at temperatures of 50°F or lower.

(c) Relative humidity shall be below 85 percent.

c. Summary.

(1) Table 6 summarizes mixing, application and overcoat parameters.

Paint	Induction Period (hours)	Mix Ratio (volume)	Pot Life (hours)	Time Before Overcoating (hours)	Time to Handle (hours)	Wet Film Thickness (mils)	Dry Film Thickness (mils)
TT-P-28G	N/A	N/A	N/A	1 @ 400°F	7 minutes @ 400°F	2	0.7-1.0

Table 6. Mixing, Application and Overcoat Parameters for High Temperature Piping.

(2) Apply two thin coats of TT-P-28G at a WFT of 2.0 mils per coat. During application (brushing), use a WFT gauge to ensure the film thickness is not exceeded. If the paint is too thick, it will delaminate (pop off) when the system comes up to temperature.

(3) Freshly painted areas should be roped off to prevent contamination during the curing process. This paint does not fully cure until it is heated. Plan painting when all other work in the area is complete to minimize damage to the coating.

7.10.6 Underway Painting - Rust Converters.

7.10.6.1 Maintenance During Operational Cycle. Preservation maintenance performed during the operational cycle should only be performed to arrest and prevent corrosion problems. The two rust converters listed below are approved for use on non-nuclear surfaces with NAVSEA-approved epoxy (MIL-DTL-24441 and MIL-DTL-23236) and enamel (Formula 111) paints.

Rust Converter Paint	Vender
VACTAN	RAYCO Services, Inc. 2512 Broad Bay Road Virginia Beach, VA 23451 (757) 481-0373
UNITED 303 TRIUMPH	United Laboratories 320 37th Avenue St. Charles, IL 60174 (800) 323-2594

7.10.6.2 Restricted Use. These rust converters are approved under the Submarine Atmosphere Control Program in the LIMITED usage category and may be used with the following restrictions:

a. Rust converters authorized for use on reactor compartment components which are governed by the Reactor Propulsion Plant Schedules are provided by separate correspondence.

b. Rust converters are approved for use on all classes of submarines.

c. Rust converters may be applied to fasteners that are permitted to be painted.

d. Rust converters are water-based products and should not be used on wetted surfaces or on surfaces of continuous immersion.

e. Rust converters are used for touch-up not to exceed 10 square feet of surface area per day.

f. Rust converters are to be applied by brush.

g. VACTAN should not be applied to surfaces that experience a service temperature greater than 149°F.

h. TRIUMPH can be used for temperatures up to 200°F.

i. The minimum temperature during application of TRIUMPH is 38^{o} F; of VACTAN is 50°F.

j. The maximum quantity to be stored on board while underway is 2 gallons.

7.10.6.3 Surface Preparation.

a. Required Tools:

(1) Needle gun.

(2) Inspection mirror (for seeing hard-to-reach areas such as the backsides of beams).

b. Process:

(1) Read and understand Section 7.3 of this chapter, “General Safety Precautions”.

(2) Read and understand Section 7.5 of this chapter, “General Surface Preparation”.

(3) Remove loose rust, scale and other contaminants using power and hand tool cleaning methods.

(4) Detergent wash the area to remove all oil and grease followed by a fresh water wash/rinse to remove any residual detergent and soluble salts.

(5) Allow surface to dry prior to applying rust converter.

7.10.6.4 Paint Application.

a. Required Tools:

(1) Brushes.

(2) Rags.

(3) Manufacturer’s PDS or ASTM F-718 sheet for VACTAN or TRIUMPH.

(4) Manufacturer’s MSDS for VACTAN or TRIUMPH.

b. Process:

(1) Water-based rust converters must be applied on a dry surface by brush only while underway in a closed ship environment.

(2) Two coats of the rust converter should be applied according to manufacturer’s directions.

(3) Freshly painted areas should be roped off to prevent contamination during the curing process.

7.10.6.5 Overcoating Upon Return To Port. Upon return to port, intact properly adhering rust converters must be overcoated with two coats of paint (either epoxy (MIL-DTL-24441, Type IV) or enamel (Formula 111), depending on the area. The following procedure shall be followed:

a. Read and understand Section 7.5 of this chapter, “General Surface Preparation”.

b. Use detergents to remove as much oil and grease as possible followed by a fresh water wash/rinse to remove any residual detergent and soluble salts.

c. Allow surface to dry.

d. Sand surface to be overcoated using 80 grit paper to provide adequate surface profile for paint adhesion.

e. Wipe surface and vacuum after sanding to remove any loose paint, dirt or dust.

f. Read and understand Section 7.3 of this chapter, “General Safety Precautions”.

g. Read and understand Section 7.6 of this chapter, “General Mixing and Paint application”.

h. Read and understand the PDS (or ASTM F-718 sheet) and MSDS for either epoxy (MIL-DTL-24441, Type IV) or enamel (Formula 111) paint systems.

i. Apply two coats of paint (either epoxy (MIL-DTL-24441, Type IV) or enamel (Formula 111), depending on the surface being painted. The final coat should be the same color as the surrounding area to maintain color uniformity. The combination of rust converter/specified overcoat paint system is considered permanent.

7.10.7 Touch-Up of Miscellaneous Areas of General Corrosion Including New High Solids Coatings.

7.10.7.1 Surface Preparation.

a. Required Tools:

(1) Needle gun.

(2) Inspection mirror (for seeing hard-to-reach areas such as the backsides of beams).

(3) Brush and dust pan.

(4) Shop-Vac type vacuum cleaner.

b. Process:

(1) Read and understand Section 7.5 of this chapter, "General Surface Preparation".

(2) Solvent clean to remove oil, grease, dirt, chemicals and water-soluble contaminants. If solvents are prohibited, use detergent and fresh water.

(3) Use a needle gun to remove loose paint and rust. A needle gun is most effectively used by holding it 90^{o} to the surface, making 2-3 passes about 6-8 inches in length over the same path, then moving over and repeating the process until the entire area is completed. The goal is removal of all rust, loose mill scale and paint to bare metal.

(4) Feather the edges.

(5) When needle gunning and sanding are complete, brush and vacuum loose pieces and dust.

(6) Check the surface for oil that may have been deposited during surface preparation. If necessary, solvent clean to remove oil.

(7) The presence of excess salts on the surface will cause premature coating failure. Therefore surface conductivity measurements should be made at this point. Contact SPRUCE barge, FMA or other knowledgable personnel if help is needed. If excessive surface conductivity is measured, wash the area with fresh water and repeat Step (7).

(8) Apply paint as soon as possible (ideally, the same day) after surface preparation has been completed. Bare metal surfaces will flash rust soon after exposure to the atmosphere. If flash rusting occurs prior to coating application, repeat Steps (3)-(8).

7.10.7.2 Paint Application.

a. Required Tools:

(1) Rollers.

(2) Brushes.

(3) Rags.

(4) Manufacturer's PDS or ASTM F-718 sheet for the following paints:

(a) Formula 150, Type IV (MIL-DTL-24441, Formula 150, Type IV, green primer).

(b) Formula 151, Type IV (MIL-DTL-24441, Formula 151, Type IV, haze gray).

(5) Manufacturer's MSDS for the following paints:

(a) Formula 150, Type IV, Component A (MIL-DTL-24441, Formula 150, Type IV, green primer, component A).

(b) Formula 150, Type IV, Component B (MIL-DTL-24441, Formula 150, Type IV, green primer, component B).

(c) Formula 151, Type IV, Component A (MIL-DTL-24441, Formula 151, Type IV, haze gray, component A).

(d) Formula 151, Type IV, Component B (MIL-DTL-24441, Formula 151, Type IV, haze gray, component B).

b. Process:

(1) Read and understand Section 7.6 of this chapter, "General Mixing and Paint Application".

(2) Read and understand the PDS (or ASTM F-718 sheet) and MSDS for the two paint systems to be used.

(a) F-150, Type IV, green primer.

(b) F-151, Type IV, haze gray top coat.

(3) Check environmental conditions. Ask for help from SPRUCE barge or FMA personnel.

(a) Surface temperature shall be at least 5°F higher than the dew point.

(b) Paint shall not be applied at temperatures of 35°F or lower.

(c) Relative humidity shall be below 85 percent.

(4) Mix F-150, Type IV, green primer according to manufacturer's instructions. Mix ratio is 1:1 by volume. (Paragraph 7.8.3 of this chapter, Mixing and Application Procedures for the Navy Epoxy Paint System (MIL-DTL-24441).

c. Summary.

(1) Table 7 summarizes mixing, application and re-coat parameters.

Paint	Induction Period (hours)	Mix Ratio (volume)	Pot Life (hours)	Time Before Overcoating (hours)	Time to Handle (hours)	Wet Film Thickness (mils)	Dry Film Thickness (mils)
F-150, green primer	N/A	1 : 1	6 @ 70°F	Minimim of 3 @ 40°F 3 @ 70°F @ 50% RH	Minimum of 24 @ 40°F 5 @ 70°F @ 50% RH	6-7	4-5
F-151, gray topcoat	N/A	1 : 1	6 @ 70°F	Minimim of 3 @ 40°F 3 @ 70°F @ 50% RH	Minimum of 24 @ 40°F 5 @ 70°F @ 50% RH	6-7	4-5

Table 7. Mixing, Application and Re-Coat Parameters for Touch-Up of Miscellaneous Areas.

(2) Apply by brush. Be certain to force coating into corners, behind beams and areas that are difficult to reach. Pay particular attention to newly installed components such as pipe hangers and clamps. (Paragraph 7.9.2 of this chapter, "Brush Application".)

(3) Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter).

(4) Wait until the first coat is dry, a minimum of 3 hours, before overcoating. If, after 3 hours, coating is not dry, check hourly until coating is dry. REMEMBER - PDS (or ASTM F-718 sheet) and Table 7 guidance for overcoating interval is an estimate. You must be able to walk on the first coat without damaging it.

(5) When first coat is dry, apply a "stripe" coat on welds, corners and edges. The "stripe" coat should be a different color than either the first coat (green) or the topcoat (gray) to facilitate coverage. F-153, Type IV, a black coating, is a good choice. If a different color is not available, use F-151, Type IV, gray as the "stripe" coat.

(6) When the “stripe” coat is adequately dry, mix F-151, Type IV, gray topcoat according to manufacturer’s instructions. Mix ratio is 1:1 by volume. (Paragraph 7.8.3 of this chapter, Mixing and Application Procedures for the Navy Epoxy Paint System (MIL-DTL-24441.)

(7) Apply by brush or roller (if a roller can reach all areas that need paint). (Paragraphs 7.9.2, “Brush Application” and 7.9.3 “Roller Application” of this chapter.) If F-151 was used as the “stripe” coat, pay particular attention to completely cover the “stripe” coat since there is no color difference to provide visual contrast.

(8) Check WFT to assure proper thickness (Paragraph 7.9.4 of this chapter).

(9) Freshly painted areas should be roped off to prevent contamination during the curing process.

(10) Allow coatings to cure per the curing schedule given in the PDS (or ASTM F-718 sheet).

(11) Ventilation should be in place during the curing process as it will facilitate curing and prevent build-up of hazardous vapors.

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APPENDIX A

SUBMARINE PAINT GUIDE

REFERENCES.

(a) OPNAVINST 5100.19 - NAVOSH Program Manual for Forces Afloat, Chapter D12, Painting and Preservation
(b) Naval Ships Technical Manual (NSTM), Chapter 631 - Preservation of Ships in Service - General
(c) Hazardous Material User's Guide (HMUG), Group 12 - Paint Materials

1. SCOPE. This information is intended for use by Ship's Force when preparing, handling and applying paint to interior submarine surfaces. A copy of this guide is available on the Shipboard Environmental Information Clearinghouse (SEIC) website at: https://navyseic.dt.navy.mil under Pollution Prevention for Submarines.

NOTE: BE SURE TO FOLLOW THE GENERAL SAFETY PRECAUTIONS SPECIFIED IN REFERENCE (a) OF THIS APPENDIX AND THE DETAILED PROCEDURES AND PRECAUTIONS SPECIFIED IN REFERENCE (b) OF THIS APPENDIX.

2. SURFACE PREPARATION.

a. According to the Rohm and Haas Paint Quality Institute (PQI) website at: www.paintquality.com, inadequate surface preparation is the leading cause of premature exterior paint failures. Paint performance depends on a properly prepared surface, the benefits of which include:

(1) Improved adhesion (less blistering, flaking or peeling).

(2) Longer service life.

(3) Resistance to corrosion.

b. More information on surface preparation for specific substrates and a list of relevant specifications and standards are available at: http://www.industrialpaintquality.com/education/surfaceprep.html

CAUTION: AVOID MIXING PAINT PRODUCTS IN AN ENCLOSED COMPARTMENT WITHOUT ADEQUATE VENTILATION. PER OPNAVINST 5090.1C PARAGRAPH 22-4.3.2.11E, THE USE OF PAINT THINNER IS PROHIBITED. REFERENCE (c) OF THIS APPENDIX PROVIDES A HAZARDOUS MATERIAL USER'S GUIDE.

3. PAINT MIXING. There are numerous considerations for effective paint mixing:

a. Always mix paints and their solvents in a designated compartment or mixing room before boarding the submarine.

b. Prior to mixing paint, read and understand the information in the manufacturer's Product Data Sheet (PDS).

c. Thoroughly mix each component of multiple component paint before combining.

d. Mix in Navy epoxy paint components at a 1:1 ratio by volume (MIL-PRF-24441).

e. Thoroughly mix paints until free of lumps, cakes and sediments.

f. MIL-DTL-24441, Type IV does not require induction, and may be used immediately.

4. PAINT APPLICATION.

a. Apply paints under the following environmental conditions:

(1) Surface temperature at least 5°F higher than the dew point.

(2) Temperature greater than 35°F.

(3) Relative humidity below 85%.

b. Other recommendations for proper paint application include:

(1) Apply paint as soon as possible following surface preparation. Two minutes of stirring or agitating is required at 4-hour intervals during the application process.

(2) To visually facilitate complete coverage, apply different colors of the same paint when successive coats are used.

(3) Use a "tack coat" of Formula 150 when painting over a fully cured epoxy paint film. The coat should be applied to a DFT of 1 mil (2 mils WFT).

(4) Paint trim, doors or similar areas after major surfaces (e.g., bulkheads) are completed.

(5) If more than seven days elapse before overcoating, the surface should be cleaned, rinsed and wiped dry. This should be followed by either: (1) a tack coat (1 to 2 wet mils) of the last coat applied, or (2) a tack coat of Formula 150 to the hard epoxy coat. Allow to dry approximately four hours before application of the next full coat of the system.

(6) If more than 30 days elapse before overcoating, clean and roughen the aged topcoat before new paint application.

5. SAFETY CONCERNS. Painting is an inherently dangerous activity. Remember to always be aware of potential hazards in the area, heed warning signs, and to follow safety guidelines and procedures.

a. Do not store paints and solvents onboard the submarine.

b. Activate the positive pressure unit prior to any interior painting.

c. Terminate all internal painting with oil based paints 5 days prior to sealing the ship. Terminate painting with latex or water based paint 3 days prior to sealing.

d. Consult the Submarine Material Control List (SMCL) for additional restrictions at: https://smcl.dt.navy.mil

6. VOLUME ESTIMATION. Use Table 1 to estimate the volume of paint required to cover a given surface area. For example: 10.0 pints of MIL-PRF-24441 Epoxy topcoat is needed to cover 280 square feet of surface area.

Surface Area in Square Feet	Pints of Paint Required			
	MIL-PRF-24441 Primer	***MIL-PRF-24441 Epoxy Topcoat***	***MIL-PRF-24635 Enamel Topcoat***	***TPD-24607 Enamel Topcoat***
20	0.5	0.7	0.3	0.3
40	1.1	1.4	0.6	0.6
60	1.6	2.1	0.9	0.9
80	2.1	2.9	1.2	1.1
100	2.6	3.6	1.4	1.4
120	3.2	4.3	1.7	1.7
140	3.7	5.0	2.0	2.0
160	4.2	5.7	2.3	2.3
180	4.7	6.4	2.6	2.6
200	5.3	7.1	2.9	2.9
220	5.8	7.9	3.2	3.1
240	6.3	8.6	3.5	3.4
260	6.8	9.3	3.8	3.7
280	7.4	10.0	4.1	4.0
300	7.9	10.7	4.3	4.3
320	8.4	11.4	4.6	4.6
340	8.9	12.1	4.9	4.9
360	9.5	12.9	5.2	5.1
380	10.0	13.6	5.5	5.4
400	10.5	14.3	5.8	5.7
420	11.1	15.0	6.1	6.0
440	11.6	15.7	6.4	6.3
460	12.1	16.4	6.7	6.6
480	12.6	17.1	7.0	6.9
500	13.2	17.9	7.2	7.1

Table 1

7. COMMON PAINTING TERMS.

a. Pot Life - The length of time that a catalyzed resin system retains a viscosity low enough to be used. Also known as working life or usable life.

b. Relative Humidity - The amount of water in the air compared with how much the air can hold at the current temperature.

c. Induction Time - The waiting period required between the time a two-part paint is mixed and the time it can be used. Also known as sweat-in.

d. Dew Point - The temperature at which moisture will begin to condense out of the air.

e. Wet Film Thickness (WFT) - Paint thickness of a wet coating (immediately after application). Measured in mils or thousandths of an inch.

f. Dry Film Thickness (DFT) - Paint thickness of a cured (dried) coating. Measured in mils or thousandths of an inch.

g. Tack Stage - The point where a slight impression remains when the paint is pressed lightly with a fingertip.

h. Tack coat - A thin layer of paint applied when painting over fully cured epoxy paint.

i. Feathering - The process of making a tapered edge between the edges of intact paint and an area that has been mechanically cleaned to allow for proper adhesion of the paint to all surfaces.

APPENDIX B

COATING INSPECTION REPORT FORM

USS _____ DATE _____

Inspection Area Name/Number: _____

_____

Inspector: _____

Location *	Percent General Corrosion	Structural Steel Defects (Pitting, Corrosion)? (Y/N)	Percent Blistering	Notes

* NOTE: Identify frame and location in relation to ship's centerline or general location within the tank or space.

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APPENDIX C
SHIPBOARD POWER CLEANING TOOLS

Vendor	Description	Type Category
Honsa Ergonomic Technologies Inc.	Pneumatic Chipping Hammers: HTC-93-1-H	Chipping Hammer
Tool Crib of the North	DW997K-2: 1/2" Extreme Drill/Driver/Hammerdrill Kit	Drill
Tool Crib of the North	DW4PAK-2K 18V Extreme contractor's Combo Package: 1/2" drill/hammerdrill, 5 3/8" Trim Saw, Recip. Saw, Floodlight, 2 Batteries, charger, & Case	Drill/Recip & Trim Saw
DESCO Manufacturing Co., Inc.	Rt Angle Sander Kit w/Dust Collector Outlet, 7" (151.217)	Grinder
DESCO Manufacturing Co., Inc.	Rt Angle Sander Kit w/Dust Collector Outlet, 4.5" (150.217)	Grinder
DESCO Manufacturing Co., Inc.	Rt Angle Sander Kit w/Dust Collector Outlet, 4" (150.317)	Grinder
DESCO Manufacturing Co., Inc.	VersaTool (170.181)	Grinder/Polisher
DESCO Manufacturing Co., Inc.	Model GD1010 - Navy HEPA Vac System (305.014)	HEPA Vacuum
DESCO Manufacturing Co., Inc.	5" Tile Stripper (180.029)	Long Handle Scaler
McMaster-Carr Supply Company	Screwdriver-Handle Flat-Blade Scraper Offset, 9/16" Blade Width, 8-1/16" Overall Length (3645A4)	Misc. Hand Tool
McMaster-Carr Supply Company	Ceramic-Blade Scraper Plastic Handle, 6-3/4" Overall Length (35685A65)	Misc. Hand Tool
McMaster-Carr Supply Company	3"W X 4-3/4"L Chisel-Edge Bent-Blade Scraper (3668A25)	Misc. Hand Tool
McMaster-Carr Supply Company	Curved Handle Brush W/Stainless Steel Bristles, 4 X 19 Rows (7187T8)	Misc. Hand Tool
McMaster-Carr Supply Company	Stainless Steel Laced Scratch Brush 7 X 4 Rows, 11/16" Trim Length, 8-3/8" Overall Length (7251T97)	Misc. Hand Tool
McMaster-Carr Supply Company	Scaling Hammer 1 lb Head, 12-1/4" Overall Length (5933A11)	Misc. Hand Tool
DESCO Manufacturing Co., Inc.	Needle Scaler System - Model 24 (130.2246)	Needle Scaler (Gun)
Northern Tool & Equipment	1350 PSI Electric Pressure Washer (157421-NET)	Pressure Washer
DESCO Manufacturing Co., Inc.	Mini-Flushplate System (100.216)	Rotary Scaler (2.25" Mini Deck Crawler)
DESCO Manufacturing Co., Inc.	FX-Flushplate System (110.216)	Rotary Scaler (4.25" Mini Deck Crawler)
EDCO Equipment Company, Inc.	EDCO Pro-Scaler, Model PS-GD-2563	Tight-Area Tool
Imperial Tool Company	Straight Geared Die Grinder, .3 HP, 5000 RPM, DOTCO #10S1093A-01	Tight-Area Tool
Imperial Tool Company	90 Degree Die Grinder, .3 HP, 12000 RPM, DOTCO # 10S1200B-36	Tight-Area Tool
Imperial Tool Company	Extended Head 90 Degree Die Grinder, .3 HP, 12000 RPM, DOTCO # 10S1290B-36	Tight-Area Tool

Vendor	Description	Type Category
D. L. Thurrott Co., Inc.	Bilge Pump, Wilden Pump, Model M1/PT/TF/TF/KT	Tight-Area Tool, Bilge Pump
McMaster-Carr Supply Company	Mini Tank Air-Powered Wet/Dry Vacuum 6 Gallon Tank, 110 Cfm, 116" Water Lift (6433T73)	Wet/Dry Vacuum
Sears Power and Hand Tools	Craftsman 2 Gal 1.5 HP Portable Wet/Dry Vacuum (17711)	Wet/Dry Vacuum

VOLUME VI

CHAPTER 8

MINIATURE/MICROMINIATURE ELECTRONIC REPAIR PROGRAM

REFERENCES.

(a) NAVSUP Publication 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) NAVSEAINST 4790.8/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-MAN-010/2M - Certification Manual for Miniature/Microminiature (2M)/Module Test and Repair (MTR) 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 U.S. 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 17-15-99 - Operations and Maintenance O and I Level
(s) NAVAIR 17-600-193-6-1 - Pre-operational Check List
(t) NAVAIR 17-600-193-6-2 - Periodic Maintenance Requirements Manual
(u) COMNAVAIRLANTINST 13650.1 - Individual Material Readiness List (IMRL) Program
(v) 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 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-674(V)(2) 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, Command, Control, Communications and Computer Readiness Assessment (C5RA)/Total Ship's Readiness Assessment (TSRA).

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 C5RA/TSRA 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 C5RA/TSRA, 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-674(V)(2) 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-674(V)(2), 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 Commander, Navy Regional Maintenance Center. The Commander, Navy Regional Maintenance Center shall maintain qualified 2M/MTR Fleet Coordinators at Norfolk Ship Support Activity (NSSA) Regional Maintenance Center (RMC)/Southwest RMC. Fleet Coordinators are responsible for 2M/MTR Inspections and Certifications in their respective geographical areas (i.e., NSSA RMC is responsible for Atlantic and Southwest RMC is responsible for Pacific).

8.2.5.1 Regional Maintenance Center. The RMC 2M/MTR Inspection and Certification Branch (NSSA RMC, Southeast RMC, Southwest RMC, Pearl Harbor, Sasebo, Yokosuka, Everett) shall:

a. Maintain a certified laboratory for the purposes of recertifying technicians, where Field Service Engineers are assigned.

b. Maintain certified 2M/MTR Inspectors.

c. Test operate and certify all 2M/MTR related equipment and report inspection results to the appropriate TYCOM.

d. Conduct technician recertifications and issue operator proficiency cards to qualified 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-674(V)(2), 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 CSE3 (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/Regional Maintenance Center for brokering. The organizational WC/MTRF will advise the Regional Support Group/Regional Maintenance Center 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 C5RA/TSRA 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 C5RA/TSRA 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 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 reference (v).

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.

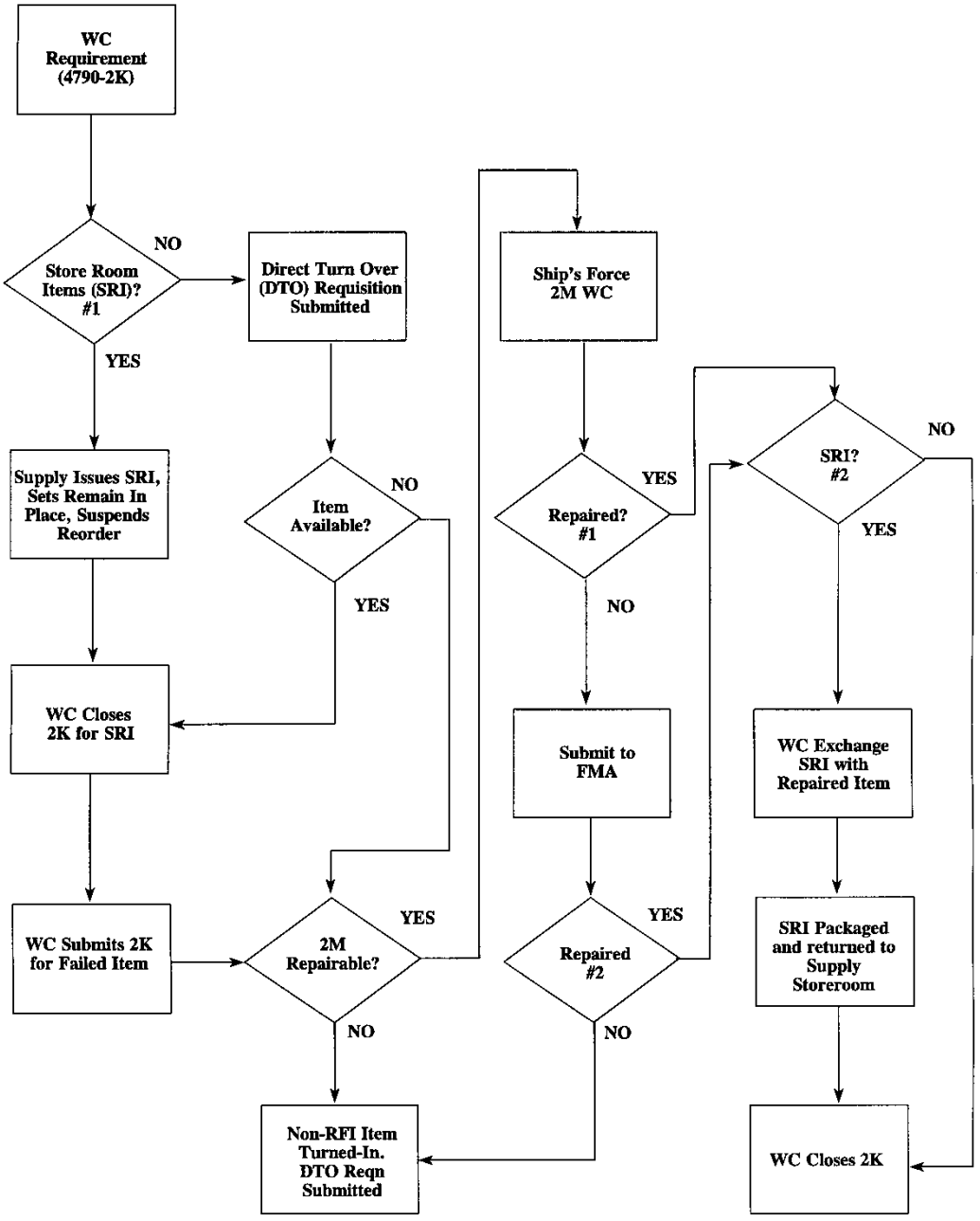
c. Promulgate amplifying procedures for out-of-area or inter-service customers to request MTRF assistance using the guidance of Appendix D of this chapter.

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.

APPENDIX A

EMERGENCY 2M REPAIR PROCESS



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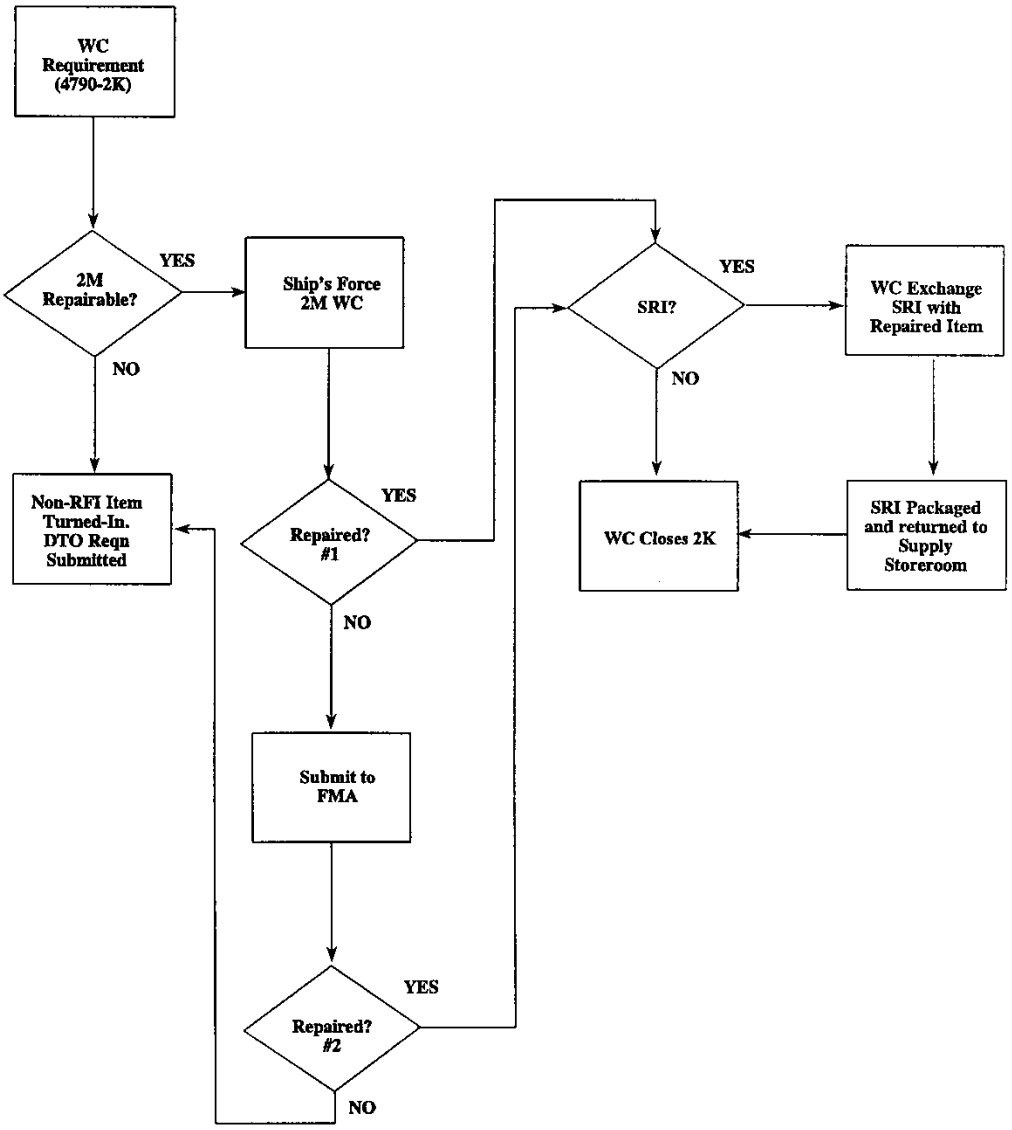
APPENDIX B

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 ProTrack, 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
CA	Enter "Y" if CASREP averted; "N" otherwise (see Note)
CC	Enter "Y" if CASREP corrected; "N" otherwise

	FIELD IDENTIFIER	DESIRED ENTRY
	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-674(V)(2) (ProTrack)
B. AN/USM-465 ATE
C. 2M ELECTRONICS REPAIR
D. 2M PIECE PARTS ELECTRONICS SUPPORT
E. RIPLE 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-674(V)(2) (ProTrack) 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-674(V)(2) 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-674(V)(2) (ProTrack) GOLD DISK LIBRARY OF LEARNED CCAS/EMS IS AVAILABLE TO ENHANCE BATTLE GROUP COMBAT SYSTEMS AND OTHER ELECTRONIC SYSTEMS SELF SUFFICIENCY

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 CVN 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 OPNAV 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 CURRENT MESSAGE FORMAT AND CURRENT PLAIN LANGUAGE ADDRESS DIRECTORY (PLAD) IS UTILIZED.

APPENDIX E

SAMPLE 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 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 CURRENT MESSAGE FORMAT AND CURRENT PLAD IS UTILIZED.

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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//
COMLANTFLT NORFOLK VA//
COMPACFLT PEARL HARBOR HI//
COMNAVSEASYSCOM WASHINGTON DC//
NUWC DET NORFOLK VA//
NAVSURFWPNCEN CRANE IN//
COMSPAWARSYSCOM WASHINGTON DC//
COMNAVSUPSYSCOM WASHINGTON DC//
BT
UNCLAS //N04790//
SUBJ/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/

		CVN 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-674(V)(2) (ProTrack)		(QTY)
	(3) HUNTRON TRACKER 2000/1000		(QTY)
	(4) OTHER (SPECIFY EQUIPMENT)		(QTY)
J.	RETURNED TO SUPPLY RFI (PART NO.) (NSN) (EQUIP/SYSTEM)		
K.	CVN DEPARTMENT/DIVISION/WORKCENTER/SUPPORT DEPT (DEPT) (DIV) (WC/SD) (EQUIP/SYSTEM)		
L.	RECOMMENDATIONS/COMMENTS//		

BT

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

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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-674(V)(2) (ProTrack)
      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 ProTrack.

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VOLUME VI

CHAPTER 9

METROLOGY AND CALIBRATION PROGRAM

REFERENCES.

(a) OPNAVINST 3960.16 - Navy Test, Measurement and Diagnostic Equipment (TMDE), Automatic Test Systems (ATS), and Metrology and Calibration (METCAL)
(b) COMNAVAIRFORINST 4790.2 - Naval Aviation Maintenance Program
(c) OPNAVINST 4700.7 - Maintenance Policy for U.S. Naval Ships
(d) OPNAVINST 4000.57 - Logistic Support of the TRIDENT and POSEIDON Fleet Ballistic Missile (FBM) Systems
(e) NAVSEAINST 4734.1 - NAVSEA Test, Measurement, and Diagnostic Equipment (TMDE) and Calibration Programs
(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-AG-IDX-010 - Test, Measurement and Diagnostic Equipment Index (TMDEI) CD-ROM Version
(i) NAVSEA ST700-AM-GYD-010/METCAL - METCAL Calibration Laboratory Requirements and Certification Guide
(j) NAVAIR 17-35QAL-15 - Naval Aircraft Carrier (METCAL) Program Manual
(k) OPNAV 43P6 - MEASURE Users Manual
(l) NAVSEAINST 4790.8/OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(m) NAVSUP Publication 485 - Afloat Supply Procedures
(n) COMNAVSEASYSCOM WASHINGTON DC 03004Z FEB 09 - SISCAL Policy Guidance - Level 2 Calibrations
(o) NAVSEA S0400-AD-URM-010/TUM - Tag-Out Users Manual
(p) NAVSEAINST C9210.4 - Changes, Repairs and Maintenance to Nuclear Powered Ships

9.1 PURPOSE. To promulgate policy and assign responsibility for the management of the Navy Test, Measurement and Diagnostic Equipment (TMDE) which includes the associated Metrology and Calibration (METCAL) program, in accordance with reference (a).

9.1.1 Scope. This instruction applies to all Navy commands whose maintenance policy and practices fall under the cognizance of references (b), (c) and (d) and Fleet shore activities such as Fleet Area Control and Surveillance Facilities. Excluded are calibration activities and equipment under the technical cognizance of the Radiation Detection, Indication and Computation program.

9.1.2 Policy. The Chief of Naval Operations (CNO), Office of the Chief of Naval Operations (OPNAV) N4, sets policy to ensure all TMDE 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 Commanders.

a. Operationally administer the TMDE and METCAL programs in accordance with reference (a).

b. Ensure that TMDE calibration and repair is performed at the lowest level practical using certified laboratories and trained technicians.

c. Calibrate all TMDE within the capability of the Regional Calibration Centers (RCC), Type Commander (TYCOM) and shipboard calibration activities.

d. Assign a Fleet Representative to the TAMS Executive Board.

e. Chair Fleet TMDE - METCAL Working Groups. Commander, Atlantic Fleet chair Test and Monitoring Systems (TAMS) Executive Board Fleet Support Standing Committee.

f. Establish the Shipboard Instrumentation System Calibration (SISCAL) program in accordance with reference (e) as required.

g. Provide funding for calibration and repair of TMDE including calibration standards, except as follows:

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

(2) Strategic Systems Programs (SSP) will fund for TRIDENT TMDE calibration and repair.

h. Evaluate Regional Maintenance Center (RMC)/RCC and coordinate with Naval Sea Systems Command (NAVSEA) for standards to support new capabilities.

i. Provide funding for audit and certification of Fleet Navy calibration laboratories and Field Calibration Activities (FCA).

9.2.2 Type Commander.

a. Assign a METCAL Manager to administer TMDE and METCAL program requirements in accordance with references (a) and (b). Serve as a voting member to the Fleet TMDE - METCAL Working Group.

b. Review Fleet Forces Allowance Change Requests and forward to the TMDE Allowance Manager. TMDE Allowance Managers are: TYCOM for aviation activities, SSP for TRIDENT activities and NAVSEA 04 for all remaining activities.

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

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

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

f. Budget and manage funds to support calibration overflow for calibration support beyond the capability of RMC/RCC, TYCOM and shipboard calibration activities.

g. Ensure that Regional Loan Pools (RLP) are established in RMC/RCC.

h. Coordinate with NAVSEA 04RM34 for Sub-Category (SCAT) assignments and Ship's Portable Electrical/Electronic Test Equipment Requirements List (SPETERL) revisions.

i. Assist Fleet Commander representatives in managing the Fleet TMDE and METCAL programs.

j. Assist platforms with their Departure From Specification (DFS) requests and coordinate approval of DFSs that require NAVSEA Technical Warrant Holder (TWH) approvals.

9.2.3 NAVSEA Technical Authority.

a. The NAVSEA METCAL TWH is the Technical Authority for all equipment/systems under the NAVSEA technical cognizance.

b. Naval Surface Warfare Center (NSWC) Corona Division is the TWH's Engineering Agent (EA) for metrology and calibration. NSWC Corona performs acceptance tests for new equipment for induction into the METCAL program, sets and modifies calibration intervals for non-installed TMDE 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.

c. Naval Surface Warfare Center, Carderock Division, Ship Systems Engineering Station (NSWCCD-SSES) is the TWH's EA for all shipboard installed instrumentation. NSWCCD-SSES determines shipboard instrumentation calibration workload (cal "YES" or "NO") by applying the principles of Reliability-Centered Maintenance, sets and modifies calibration intervals for shipboard instrumentation/systems, develops and validates associated calibration procedures and publishes related calibration documentation such as ship-specific Calibration Requirements Lists (CRL), calibration procedures that are promulgated via the Planned Maintenance System (PMS) (Maintenance Requirement Cards (MRC)), and System Calibration Procedures (SCP) in accordance with NAVSEA directives (see paragraph 9.7 of this chapter). NSWCCD-SSES may be contacted by telephone or message for resolution of urgent technical problems related to calibration of shipboard instrumentation, calibration PMS and/or SCPs. (SSES).

d. NSWC Corona Division, Seal Beach Detachment is the TWH EA for TMDE, prepares specifications for new TMDE and makes technical recommendations to the TMDE Program Manager on what instruments are listed in the TMDE Index. Seal Beach Detachment may be contacted by telephone or message for resolution of urgent technical problems related to all Navy TMDE.

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 Manager.

b. Monitor the effectiveness of 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 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.

9.2.5 Commanding Officers All Forces.

a. Maintain a high degree of TMDE calibration readiness including installed instruments.

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

c. Maintain TMDE allowances in the SPETERL. Advise the TYCOM METCAL Manager and contact the CTRA to fill deficiencies prior to submitting requisitions for replacement test equipment through the supply system. Deliver excess test equipment to the CTRA facility.

d. Use only standard test equipment listed in reference (h). Inform the TYCOM METCAL Manager of system maintenance requirements that are not supported by standard test equipment. Special Purpose Electronic Test Equipment (SPETE) that is approved per reference (e) is authorized for designated systems only. SPETE shall not be used as a general purpose test requirement.

e. Ensure TMDE is submitted for calibration prior to the calibration due date, with all accessories, power cords and technical manuals required to complete calibration.

f. Submit pre-deployment calibration requirements to the RMC METCAL Coordinator at least 60 days before deployment. Conduct an inventory of all SPETE to confirm material condition and calibration due dates.

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

9.2.6 Commanding Officers Surface Force.

a. Ensure the SGCP FCA is currently certified and properly staffed with trained personnel, documentation and calibration standards (allowance quantities listed in the SPETERL).

b. Ship's Force is responsible for the calibration of all instrumentation within their SGCP FCA capability. SGCP trained technicians are the only authorized personnel to accomplish calibration using SGCP calibration standards. The SGCP calibration procedures are found in the shipboard Planned Maintenance System (PMS), workcenter FCA1, MIP 9802 series. SGCP calibration standards allowance quantities are listed in the SPETERL per reference (i).

c. Ensure the CRL is used as a technical authority guidance to determine calibration requirements for all installed instruments. The calibration requirement determines whether an installed instrument is either critical or non-critical. Critical instruments are defined as instrumentation that monitors 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. These instruments are calibrated at a specific frequency (e.g., 12, 18, 24 or 36 months). All other instruments are classified as non-critical, No Calibration Required (NCR).

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

e. Ensure FCA 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 RMC METCAL Coordinator.

g. Maintain liaison with the RMC METCAL Coordinator to make sure TMDE 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 or as indicated in the SPETERL (borrow from Regional Loan Pool).

i. Ensure all TMDE has a current calibration sticker, reference (i).

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

k. Ensure all ship's instrumentation appears in a formal calibration accounting and recall system. This data should reflect CRL information such as system, nomenclature, periodicity, etc. The CRL should also be validated annually and these updates (adds/deletes) should be forwarded via Technical Manual Deficiency/Evaluation Report (TMDER) to correct the hull specific CRL.

l. SGCP FCA calibration procedures are listed in Maintenance Index Page (MIP) 9802 series and should be listed under PMS work center FCA1.

9.2.7 Commanding Officers Naval Air Force. Naval Air Force activities shall also follow the detailed procedures outlined in reference (j) for TMDE management and for operation of the consolidated FCA.

9.2.8 Regional Maintenance Center Metrology and Calibration Coordinators.

a. 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 RMC/RCC shipboard calibration coordinators and the Immediate Superior In Command (ISIC) to prevent or resolve calibration scheduling and readiness problems.

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

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

e. Notify TYCOM METCAL Managers, as applicable, of all changes in RMC/RCC calibration capability.

f. Assist RMC/RCC calibration laboratories in obtaining calibration or repair services for laboratory standards.

g. Identify TMDE calibration requirements beyond the technical capability of the RMC/RCC. Coordinate with TYCOM METCAL Managers for scheduling of TMDE overflowed to an approved calibration laboratory.

9.2.9 Regional Maintenance Center/Regional Calibration Center.

a. In the absence of an approved Instrument Calibration Procedure for TMDE within the general range of the laboratory capability, develop a Local Calibration Procedure in accordance with reference (e), 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.

b. Calibrate and/or repair TMDE including calibration standards assigned by the RMC METCAL Coordinators. Document all calibration actions using the Metrology Automated System for Uniform Recall and Reporting (MEASURE) or the TYCOM directed data collection method.

c. Ensure that electronic TMDE submitted by the Fleet is standard test equipment listed in reference (h). Contact the submitting activity and the TYCOM METCAL Manager when non-standard TMDE is submitted for calibration. Non-standard TMDE will not be calibrated or repaired unless approved by the TYCOM.

d. Ensure all laboratory standards are properly calibrated at the lowest appropriate level. Notify the TYCOM METCAL Manager of any lost or reduced laboratory capability.

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

f. Prepare and submit Calibration Problem Reports to NSWC Corona for assistance or guidance concerning calibration problems encountered during operation of the calibration laboratory.

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

9.3 CALIBRATION MANAGEMENT.

9.3.1 Shipboard Gage Calibration Program Field Calibration Activity (Surface Force only). The SGCP provides onboard calibration capability for TMDE in the following measurement areas: temperature (high and low), pressure, vacuum and torque (selected ship classes only).

a. Only certified SGCP FCAs are authorized to calibrate installed instrumentation within their capability as designated in the CRL. Beyond capability calibration is submitted to the RMC Calibration Coordinator for scheduling and accomplishment.

b. The SGCP technicians are responsible for placing the appropriate METCAL label on the installed instruments. The SGCP Calibration Coordinator is responsible for adding the calibration data into the TYCOM directed recall program.

c. SGCP FCAs shall establish PMS work center FCA1. PMS MIP 9802 series are the calibration procedures for SGCP FCAs.

d. Non-critical instrumentation will have an NCR METCAL label attached. When a 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. If a primary instrument is out of commission, a NCR instrument may be calibrated at the discretion of the inspection team to validate system parameters.

e. The SGCP Calibration Coordinator is responsible for ensuring that the CRL data is aligned with ship's configuration and ensuring that instrumentation identified in the TYCOM calibration recall inventory matches CRL data: system, nomenclature, periodicity, etc. Recommended changes shall be forwarded to the EA via METBENCH Calibration Management System (MCMS) or TMDERs.

9.3.2 Calibration Accounting. TMDE calibration actions are recorded in the TYCOM directed Calibration Recall Program. Surface force ships use one of the three different programs: MEASURE (LHA/LHD), MCMS, or the TYCOM Calibration Recall Program (TCR).

a. Measure implementation and operation guidance, reference (k).

b. MCMS supports surface force ships and provides shipboard personnel with the capability to update inventory files using LAN access. MCMS also provides the capability to generate reports and upload data to the master server through distance support. Readiness information and inventory status is readily available to Ship's Force and TYCOM METCAL Managers.

c. TCR program (Excel file) is used on those ships that do not yet have MCMS installed. The file provides inventory information to track calibration status.

9.3.2.1 Shipboard Calibration Recall Inventories for MEASURE, TCR, and MCMS (Surface Forces).

a. MEASURE and TCR.

(1) "S" inventory: All installed instrumentation identified in the CRL and mechanical TMDE that is not SCAT coded (i.e., torque wrenches, micrometers, etc.). The SGCP calibration standards are included in this inventory.

(2) "E" inventory: All portable test equipment including electronic and mechanical SCAT coded test equipment that appears in the SPETERL (excluding the SGCP calibration standards).

b. MCMS.

(1) "S" inventory: All installed instrumentation identified as CAL=Y in the CRL. (All installed instruments i.e., both Cal = Y or N are in the "CRL" tab.)

(2) "E" inventory: All portable test equipment including electronic and mechanical SCAT coded test equipment that appears in the SPETERL (excluding the SGCP calibration standards).

(3) "P" inventory: All mechanical TMDE that is not SCAT coded (i.e., torque wrenches, micrometers, etc.). The SGCP calibration standards are included in this inventory.

9.3.3 Submarine Forces Management Policy.

a. Personnel certified as submarine FCA technicians will use PMS MIPs/MRCs to accomplish shipboard in-place calibrations.

b. Personnel certified as FCA Technicians for platforms assigned to COMSUBLANT/COMSUBPAC are to utilize PMS MIP 9802 series for the performance of in-place shipboard instrument 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 and MEASURE systems as directed by the appropriate TYCOM. All assigned MIPs/MRCs are to be maintained in accordance with the requirements of reference (l).

d. All components being calibrated using a calibrator (i.e., 3666, 3461, 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 CRL.

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 RMC/RCC 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/SPS-73 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, the RMC METCAL Coordinator may authorize an extension of the ten day limit on a case basis.

c. All GPETE returned to the RLP shall be inspected by representatives of the lending RMC/RCC and the borrowing command. The original inventory receipt is checked to see if the GPETE has been damaged or is missing accessories provided at the time of the loan. GPETE lost, damaged beyond repair or destroyed must be surveyed by the borrowing command using procedures established in reference (m). A copy of the completed survey report shall be forwarded to the appropriate TYCOM METCAL Manager.

9.5 REPLACEMENT OF GENERAL PURPOSE ELECTRONIC TEST EQUIPMENT/CALIBRATION STANDARDS.

9.5.1 Depot Level Repairables. GPETE/Calibration Standards (CAL STD) (7Z Cog), certified by a RMC/RCC or a higher-level activity as BER will be turned into the Naval Supply System. (Note: NAVAIR CAL STDs will not fall under these instructions.) For BER NAVAIR CALSTDs, RMC/RCC and Customer activities are required to contact TYCOM METCAL manager.

a. The RMC/RCC certifying the GPETE/CAL STD as BER may turn the defective unit in to the Navy Supply System for the customer activity, provided the customer has given the RMC/RCC a requisition number under which a replacement will be ordered. If the RMC/RCC turns the defective GPETE/CAL STD in to 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 activity may accept return of the defective GPETE/CAL STD from the RMC/RCC and initiate turn-in and replacement procedures through the normal Navy Supply System process.

c. Depot Level Repairable GPETE/CAL STD will not be processed for survey by a RMC/RCC.

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

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

b. The RMC/RCC certifying the GPETE/CAL STD as BER 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 RMC/RCC.

9.6 TEST MEASUREMENT DIAGNOSTIC EQUIPMENT MANAGEMENT.

9.6.1 Ship's Portable Electronic Test Equipment Requirements List. The SPETERL is the allowance document for all GPETE, 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 electrical and 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 in accordance with reference (m), with the lowest priority number assigned to the TMDE currently being procured to fill outstanding deficiencies. SCAT codes are the basis for identifying TMDE 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, Measurement and Diagnostic Equipment Readiness Assessment.

9.6.5.1 Consolidated Test, Measurement and Diagnostic Equipment Readiness Assessment Program. The CTRA Program is a joint fleet program that improves fleet and shore command non-Aviation TMDE readiness. The CTRA Program 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 Program Managers. TYCOM METCAL Program Managers are responsible for the following:

a. Scheduling 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 and promulgate CTRA schedule as required.

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

9.6.5.2.1 Consolidated Test, Measurement and Diagnostic Equipment Readiness Assessment Review Process.

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

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

c. Review SPETERL and electronic (E) TMDE 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 TMDE inventory and revisions to the TYCOM approved calibration recall system inventory, prime system and test equipment 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 to determine calibration requirements (TCR and MEASURE ships only). Mechanical test equipment will be listed on this mechanical inventory. Use the CRL to validate the recall inventory (TCR and MEASURE ships only).

e. Provide the results of the assessment to the ship.

9.6.5.2.2 Consolidated TMDE Readiness Assessment Test, Measurement and Diagnostic Equipment Redistribution. The CTRA Center manages the redistribution of Fleet TMDE to fill allowance deficiencies or replace equipment that is missing or BER. Excess TMDE and decommissioned ships' assets are received and made available for redistribution to FLEET activities. Fleet activities are required to forward all excess TMDE to the CTRA Center and to utilize the CTRA Center for the initial requests to fill replacement or deficient SCAT coded TMDE.

9.7 SHIPBOARD INSTRUMENTATION AND SYSTEM CALIBRATION. The SISCAL Program, which includes SGCP, is responsible for the calibration and maintenance support for surface force ships and Landing Craft Air Cushion (LCAC) installed instrumentation and machinery control system calibration requirements, reference (e). Installed instrumentation calibration support parameters are documented in the ship specific CRL as follows:

a. Calibration Activity. Defines responsibility for calibration of shipboard installed instrumentation for the following three calibration activities.

(1) Calibration Activity 1 (Level 1). SGCP FCA is responsible for calibrating stand-alone instrumentation (i.e., gages, thermometers and switches). Instruments are typically calibrated onboard (in place/onsite) by the certified SGCP technicians using PMS MIP 9802 calibration procedures.

(2) Calibration Activity 2 (Level 2). SISCAL teams perform calibration supports for machinery control system components (i.e., pressure transducers, temperature transducers, signal conditioners, display devices, meters, etc.). Except during yard/industrial periods when testing is mandated, these components are not calibrated as individual items. Instead, the entire measurement chain is calibrated as a single entity using Navy approved calibration standards and SCPs. Level 2 calibrations are performed onboard (in place/onsite) by SISCAL teams certified by the SISCAL EA, SSES 953 and include only the following:

(a) Surface ship - NSWC SSES lead SISCAL teams, NAVSHIPYD and IMF Pearl Harbor and NAVSHIPREPFAC Japan.

(b) Landing Craft Air Cushion (LCAC) - SISCAL teams at Assault Craft Units 4 and 5.

(3) Calibration Activity 3 (Level 3). RCC calibrates those instruments which require the use of unique calibration standards or facilities.

b. SISCAL Scheduling. SISCAL scheduling begins approximately six months before expiration date and is coordinated between the Port Engineer/SHIPSUP and the SISCAL scheduler. The SISCAL workload is the Calibration Activity 2 instruments and is accomplished only by the NAVSEA authorized calibration agents listed above. SISCAL visits are scheduled for both triennial SISCALs and subsequent return visits (call-back). If a ship is in an industrial environment then reference (n) applies until SISCAL effort can commence within six months post industrial period.

(1) Triennial SISCAL visit at the calibration due date.

(2) Call-back SISCAL visits. Listed as either a SISCAL call-back or SISCAL II. SISCAL II is used when more than 100 instruments require calibration.

(3) A SISCAL report is provided to the ship after the SISCAL visit. The report identifies the results of the calibration effort and includes a listing of all instruments that were not calibrated during the visit. Ship's Force will submit a 4790/2K to identify these instruments. Call-back 2K requests citing multiple instruments are preferred to maximize SISCAL manpower availability and minimize cost. Non-specific requests (e.g., calibrate various instruments) should be avoided since the task breadth (quantity of instruments) and scope (type of instruments) cannot be readily determined. Instruments that were not calibrated are listed under the following categories:

(a) Rejected (broken or out of tolerance).

(b) Previously rejected (PRE_REJ), left over from last SISCAL.

(c) Not Installed (NI), instrument missing.

(d) Not Done Due to Ship Operations (NDSO).

(e) Not Done at Ship's Request (NDSR).

(f) Not Done Due to Shipyard (NDSY).

(g) Could Not Be Isolated (CNI).

(h) Equipment Out Of Commission (OOC).

(i) Not On Site Capable (NOSC), No Procedure (NOPRO) or No Calibration Standard (NS). NSWC SSES will coordinate with NAVSEA Program Offices to resolve.

c. Current Ships Maintenance Project (CSMP). Ship's Force will submit a ships maintenance action form OPNAV 4790/2K or Automated Work Request, to identify the deferred maintenance for the instruments not calibrated during the SISCAL visit. Following additional guidance is provided to assist in drafting the 2K or the Automated Work Request.

(1) CSMP Summary: Identify either as “SISCAL call-back” or “SISCAL II”. SISCAL II is used when more than 100 instruments require calibration.

(2) Problem Description: Instruments were not calibrated during the SISCAL visit.

(3) Problem Solution: Calibrate following level 2 instruments (list by CRL reference number or attach a 2L as required with the CRL reference numbers for each instrument). Rejected, CNI and OOC items would be identified in a separate 2K for ordering replacement parts and called down from the CSMP for accomplishment when instruments are replaced or repaired.

d. Departure From Specification (DFS). SISCAL DFS messages are requests for minor temporary departures and are submitted in accordance with Volume V, Chapter 8 of this manual. A SISCAL DFS would be submitted for the following reasons:

(1) Extending the periodicity of the ship’s SISCAL requirement. TYCOM approves DFS up to six months. DFS in excess of six months requires NAVSEA 04RM concurrence.

(2) Extending the periodicity for individual level 2 and 3 instruments with expired calibration due dates or replaced while away from homeport/calibration facility.

(3) Level 2 instruments that were not calibrated during SISCAL due to lack of a calibration procedure or calibration standard.

(4) Other shipboard SISCAL DFS requests will be evaluated on a case-by-case basis.

e. DFS requests will not be approved for the following:

(1) Instrumentation within the calibration capability of the SGCP FCA.

(2) Instrumentation not calibrated during a SISCAL visit due to an out of commission or rejected status.

f. SISCAL workload may only be contracted out if certified as a Navy lab and approved by NAVSEA 04 to use SCPs (system calibration). Commercial activity must calibrate using periodicities listed in the CRL. The commercial activity must provide calibration data to Ship’s Force in format to accommodate entry into TCR.

9.7.1 Calibration Requirements List. The CRL is the technical reference for installed calibration requirements and includes data pertinent to each instrument (e.g., nomenclature, system, periodicity, calibration activity, etc.). SISCAL teams, SGCP, Aviation Intermediate Maintenance Departments (AIMD) and Regional Calibration Centers provide SISCAL calibration support. Approved calibration procedures include MIP 9802, SCP and Instrument Calibration Procedures. Only SISCAL Teams are authorized to use SCPs.

a. The CRL is the primary technical reference for shipboard installed instrumentation. The CRL is distributed to the Engineer Officer and AIMD Officer (LHA/LHDs/CVNs).

b. CRL Validation.

(1) Ship’s Force validates CRL to make ship specific. Validate SGCP responsible instrumentation and submit TMDER changes for conflicts in nomenclature, function, range, location or calibration requirement. The SISCAL team is responsible for validating SISCAL instruments.

(2) Feedback to CRL changes for add/deletes or changes can be submitted using MCMS or TMDER, via mail or email

Hardcopy changes shall be addressed to:
COMMANDER, CODE 310
TMDER BLDG 1388
NAVSURFWARCENDIV NSDSA
4363 MISSILE WAY
PORT HUENEME CA 93043-4307
TMDERs can also be generated and sent electronically at the NSDSA website:
https://nsdsa2.phdnswc.navy.mil/tmder/tmder.asp?lvl=1

(3) Ship's Force match CRL data to the METCAL AIS or Calibration Recall and Inventory System inventory and submit changes to the MEASURE Operational Control Center East or West. The CRL and METCAL AIS do not have matching data elements as MEASURE and Calibration Recall and Inventory System; refer to the CRL CD-ROM Users Guide.

c. The CRL is the technical authority document for all shipboard instrumentation calibration requirements. To preclude continuous and duplicative review of TMDERs, inspecting activities are to coordinate directly with NAVSEA METCAL TWH, regarding any instrument believed to be critical but indicates No Calibration Required in the CRL. Ship's Force is not required to calibrate these instruments unless specifically approved by NAVSEA METCAL TWH.

d. Calibration intervals in the CRL take precedence over the intervals in technical manuals and the Metrology Requirements List.

e. Broken or inoperative Level I installed instruments identified as CAL=Y in the CRL that are replaced during deployment must be calibrated prior to use. If unable to calibrate due to lack of Calibration Standard, qualified personnel or calibration procedure, submit a DFS in accordance with paragraph 9.7d. of this chapter and use an "Out-of-Cal" label in accordance with reference (o). Extreme care should be exercised when using "Out-of-Cal" instruments.

9.7.2 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.

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.

9.7.3 Markings for Test, Measurement and Diagnostic Equipment.

a. Installed Instrumentation. All 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. Serial number should include: Hull Number + CRL reference number (i.e., DDG5100025).

b. Serial Numbers for TMDE other than Installed Instrumentation. All TMDE will be clearly labeled with current calibration stickers and have easily read serial numbers. If the TMDE item 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 TMDE without space for inscribing a serial number. Serial number should include: Hull Number + Work Center + four digit sequential number starting with 0001 (i.e., DDG51OE010001). The new serial number should be annotated in the TYCOM Calibration Program, either the SGCP FCA for mechanical instrumentation or the Test Equipment Petty Officer for electronic test equipment.

c. The "Out-of-Cal" label listed in reference (o) is not a METCAL label but rather an operational label used to make watch standers aware of abnormalities that require additional attention. Please refer to reference (o) for proper use of the label. Extreme care should be exercised when using "Out-of-Cal" instruments.

9.8 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 TMDE 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: 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 Hull, Mechanical and Electrical (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, TMDE are considered to be all shipboard GPETE, SPETE, Support Equipment, calibration standards and the installed instrumentation that 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 (j) is a parallel effort onboard aircraft carriers, and may be used as an authoritative reference for overlapping procedures and responsibilities. Reference (k) 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 (j) 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 Radiation Detection, Indication and Computation 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 TMDE.

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), except as noted in paragraph 9.7 of this chapter, where the CRL takes precedence for SISCAL instrumentation calibration intervals and procedures. Provide repair services for all qualifying shipboard TMDE per reference (j).

(4) Maintain custody of, and be accountable for, all shipboard standards for calibration of TMDE.

(5) Use MEASURE to plan, schedule, monitor and document the calibration of all TMDE per reference (k).

(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 workload.

(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 TMDE 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).

(12) Coordinate the calibration of TMDE that is 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:

(a) Ashore AIMDs and RCCs.

(b) System Command sponsored Navy Calibration Laboratories.

(c) Navy depot level activities.

(d) Other Department of Defense calibration laboratories approved for use by TYCOM.

(e) Navy Certified commercial calibration laboratories.

(13) Coordinate all TMDE repairs with outside resources. The precedence (based on cost effectiveness) for selecting the outside resource for repairs is:

(a) AIMD and RCC.

(b) COMNAVAIRSYSCOM Depot Level Rework Program for Support Equipment and Items (Individual Material Readiness List).

(c) Naval shipyards and ship repair facilities.

(d) Designated Overhaul Points listed in the Master Repairable Item List.

(e) Naval Systems Command field activities.

(f) Navy Certified 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).

(14) Submit only operational TMDE 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.

(15) Request TYCOM authorization (COMNAVAIRFORCE) for repair of NAVAIR assigned calibration standards per the NAVAIR METCAL Scheduling Letter, NAVAIR Ltr 13640 Ser 3.9.2/series. Contact information for COMNAVAIRFORCE:

Phone - Commercial (757) 445-4434, DSN 565-4434
Fax - Commercial (757) 444-1690, DSN 564-1690
Message - COMNAVAIRFORCE SAN DIEGO CA//N421Q/N421QC//

(16) Coordinate with Commander, Regional Support Center METCAL manager for SISCAL scheduling. AIMD is authorized to calibrate all instrumentation within the capability of the FCA except instruments requiring SCPs per the CRL. SCPs will be performed by SISCAL teams. Ensure SISCAL instrumentation is calibrated at the periodicity with the procedure listed in the CRL.

(17) Ensure the FCA provides support under the Strike Force Intermediate Maintenance Activity concept.

c. Engineer Officers shall:

(1) Report all TMDE which require calibration to the AIMD Officer for inclusion in the ship's calibration recall schedule upon request.

(2) Deliver portable TMDE for calibration to the FCA per the AIMD managed calibration recall schedule.

(3) Coordinate in-place calibration requirements for non-portable TMDE with the AIMD Officer.

(4) Ensure only operational TMDE 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 TMDE inventory changes, TMDE 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 TMDE.

(7) Report the inventory and configuration of all TMDE 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 TMDE 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 TMDE eligible for calibration to the AIMD Officer for inclusion in the ship's calibration recall schedule.

(2) Deliver portable TMDE for calibration to the FCA per the AIMD managed calibration recall schedule.

(3) Ensure only operational TMDE 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 TMDE with the AIMD Officer.

(5) Notify the AIMD Officer and, when applicable, the Combat Systems Officer, of any TMDE inventory changes, TMDE 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 TMDE.

(7) Submit all TMDE 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 TMDE for calibration to the FCA per the AIMD managed calibration recall schedule.

(3) Ensure only operational TMDE 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 TMDE inventory changes, TMDE 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 TMDE when assets are not available through CTRA programs.

(6) Report the inventory and configuration of all TMDE supporting combat systems using SCLSIS.

(7) Submit all TMDE 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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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
(c) NAVSEA S9086-WK-STM-010-NSTM - Chapter 670 (Stowage, Handling and Disposal of Hazardous General Use Consumables)
(d) OPNAVINST 5100.19 - Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
(e) LPD 17 MOGAS System Technical Manual
(f) CNSFINST 4020.1 - Motor Gasoline (MOGAS) Certification Program for L-Class Ships

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) through (f) 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).

10.4.6 LPD 17 Class MOGAS System.

10.4.6.1 Storage and Handling. The LPD 17 Class MOGAS System has the capability of storing MOGAS containers up to 1500 gallons (combination of 18 and 6 gallon bladders, 55 gallon drums and 5 gallon cans), in the MOGAS Service and Bladder Storeroom (Compartment Number 4-145-4-G) and three 500 gallon bladders (bulk fuel) on a jettison rack, for a total of 3000 gallons. The passageway (Compartment Number 4-143-2-L) adjacent to the MOGAS Ready Service and Bladder Storeroom was modified to support MOGAS transfer from 55 gallon drums to portable containers, or between containers.

10.4.6.2 Firefighting and Safety Requirements. The LPD 17 Class ships are designed to store MOGAS fuel containers inside the MOGAS Ready Service and Bladder Storeroom. The MOGAS storeroom and transfer room firefighting and safety systems have been installed, satisfactorily tested and validated to satisfy all required NAVSEA Safety and Firefighting requirements, to include:

a. Eductor Sweep hose for dedicated drainage.

b. Standard Navy Gasoline Spill Clean-up Kit.

c. AFFF Fire Protection System.

d. HFP System.

e. Smoke and Heat Detection System.

f. Explosion proof electrical equipment (storeroom only).

g. Any electrical equipment (including switches and power outlets) in the transfer room that were not explosion proof or intrinsically safe were relocated to be at least 48 inches above the deck.

h. Dedicated Ventilation System.

i. Vapor Detection System.

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 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.

c. LPD 17 Class MOGAS Assessment and Certification should be conducted in accordance with reference (f).

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 Chapter 19, Appendix E of this volume).

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 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)/Regional Maintenance Center (RMC). Depending on the workload, assist teams from the FMA/RSG/RMC 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 Chapter 30 of this volume.

b. Ship personnel desiring to make use of FMA/RSG/RMC facilities should send a work request (OPNAV 4790/2K) to the FMA/RSG/RMC 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/RMC 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/RMC 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/RMC 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 an 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/RMC 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 other availabilities, unless the repairs are of an emergent nature and have been documented with a Casualty Report in accordance with reference (d). FMAs/RSGs/RMCs 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/RMC/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/RMC 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, Part I, 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, Part I, 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).

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VOLUME VI

CHAPTER 12

DEGAUSSING

REFERENCES.

(a) OPNAVINST S8950.2 - 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 and is also performed to place the ship's permanent magnetization into a standard condition such that it is approximately the same as the other ships in the class. 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. Different combinations of degaussing coils, type of controls and power supplies help to identify a degaussing system.

12.2.3 Magnetic Compass Compensation. Magnetic field from a ship's degaussing system can interfere with a ship's magnetic compass heading and make the system useless for navigation. Per reference (b), a compensating coil is set up around the magnetic compass to neutralize the effect of degaussing coil field in the vicinity of the compass. Magnetic compasses that use fluxgate technology have a degaussing compensation system that does not rely on compensation coils.

12.2.4 Check Ranging. The action of a ship making reciprocal range runs over an instrumented array, 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. Underwater Electromagnetic Measurement Systems for check ranging are available at the following locations:

San Diego, CA	Norfolk, VA
Pearl Harbor, HI	Mayport, FL
Yokosuka, Japan	New London, CT
Kings Bay, GA	

12.2.5 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.

12.3 SHIPS AND SUBMARINES WITH INSTALLED DEGAUSSING SYSTEMS AND LCS 2 CLASS.

a. Reference (a) mandates check ranging for ships. To meet minimum requirements, a satisfactory check range is required every six or twelve months depending on the type of system installed. 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**.

(8) After a major alteration to the hull and superstructure.

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) Surface ships not equipped with an installed degaussing system are not required to check range (except LCS 2 class).

c. A ship which receives notification from an MSF of unsatisfactory magnetic condition and the reason for unsatisfactory signature is a degaussing equipment failure, the ship is required by reference (a) to report via Casualty Report as directed by Chapter 5 of this volume.

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. Range crossings will be considered invalid unless the range is clear of other traffic (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. Actual coil currents in effect during the crossing MUST be recorded and reported to the MSF for satisfactory check ranging.

(2) Ships with Advanced Degaussing systems. Due to the large number of coil currents required to be reported, ships with these systems must make arrangements with the MSF to deliver this information by facsimile or other electronic methods after the crossing occurs.

(3) Ship's Draft. Forward and aft drafts. Provide actual keel drafts, vice navigational drafts.

(4) 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 by paragraph 12.3 of this chapter.

c. Issue waivers to check ranging and deperming requirements if necessary. The Technical Warrant Holder (NAVSEA 05P1) may be contacted if advice on impact to ship susceptibility is needed.

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**.

(3) Submit a minor Departure From Specification per Volume V, Part I, Chapter 8 of this manual if range checking requirements of paragraph 12.3 of this chapter are not met.

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 Type Commander/Immediate Superior In Command.

a. Ensure that ships check range as required by paragraph 12.4 of this chapter.

b. Issue waivers to check ranging and deperming requirements if necessary. The Technical Warrant Holder (NAVSEA 05P1) may be contacted if advice on impact to ship susceptibility is needed.

c. 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.

f. Submit a minor Departure From Specification per Volume V, Part I, Chapter 8 of this manual if range checking requirements of paragraph 12.4 of this chapter are not met.

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VOLUME VI

CHAPTER 13

SURFACE SHIP CORROSION CONTROL

REFERENCES.

(a) NAVSEA S9086-DA-STM-010 - NSTM 100, Hull Structures
(b) NAVSEA S9086-VD-STM-010 - NSTM Chapter 631 (Preservation of Ships In-Service - General)
(c) NAVSEA Technical Publication T-9630-AB-MMD-010/ALL USN HULLS Revision 2 - Corrosion Control Assessment and Maintenance Manual (CCAMM) for the Corrosion Control Information Management System (CCIMS)
(d) COMNAVSURFOR Instruction 3120.1 - Zone Inspections
(e) COMNAVAIRFORINST 4790.1 - Commander Naval Air Forces Surface Maintenance and Material Management (3-M) System Manual

LISTING OF APPENDICES.

A Preservation Departures from Specifications Process Decision Tree

13.1 PURPOSE. To provide basic guidelines necessary to maintain an effective Corrosion Prevention and Control Program. Guidance for inspection, prevention and repair of corrosion on ships is contained in references (a), (b) and (c), which supersedes all previous class specific Corrosion Control Manuals distributed by Naval Sea Systems Command. In addition, this chapter requires the use of the Corrosion Control Information Management System (CCIMS) database as the repository for all inspection and maintenance data. The maintenance of coating integrity to prevent structural degradation is necessary to ensure the safe and proper operation of the ship. Maintenance of areas with severe corrosion require enhanced and targeted surveillance due to the highly corrosive conditions that can lead to higher risk of accelerated structural degradation. Reference (a) provides structural system survey and inspections criteria for surface ships and aircraft carriers. Reference (c) provides specific requirements for inspecting tanks and voids and provides condition based maintenance guidance for availability planning.

13.2 BACKGROUND. Protective coatings are the most widely used method of corrosion control and have specific applications. Therefore, the physical location and operating environment shall 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. The Department of Defense “Annual Cost of Corrosion for Navy Ships” study identified corrosion control/preservation as a high cost driver for ship life cycle maintenance. In order to reduce this life cycle maintenance cost, an accurate database of coating conditions is required to facilitate timely and appropriate maintenance decisions. The failure to identify, track, and repair a preservation system deficiency can result in coating failure and can result in damage to the structure, substantially increase repair costs and adversely impact both the seaworthiness and combat worthiness of the hull. The CCIMS database was developed to document coating conditions to assist in maintenance planning. The CCIMS database is located at https://ccims.supship.navy.mil/ and can be accessed to record the results of tank, void and general structural inspections, coating systems installed, and all repairs conducted.

13.3 POLICY.

a. All Level 1 and 2 corrosion control structural system surveys and inspections shall be accomplished in accordance with reference (a).

(1) Level I Structural System Surveys are defined as scheduled inspections per the Class Maintenance Plan specific to each ship class and are focused on ship structure and foundations.

(2) Condition-directed Level 2 structural inspections shall be conducted if warranted by deficiencies identified by a Level 1 survey. The Level 2 inspection shall include, but is not limited to, thickness gauging measurements and Non-Destructive Testing as applicable to the structural condition to allow for adequate assessment.

b. The CCIMS database shall be used for documenting coating system inspections, maintenance and repairs.

c. All inspectors and surveyors shall be qualified in accordance with reference (c) requirements.

d. Whenever a tank or void is opened for manned entry, an inspection shall be performed. The inspection shall be performed in accordance with reference (c). All inspection results will be entered into the CCIMS database.

e. For surface force ships and aircraft carriers, the CCIMS database will be used for ship maintenance availability planning.

NOTE: ANY OUT-OF-SPECIFICATION CONDITION FOUND IS TO BE MITIGATED IN ACCORDANCE WITH APPENDIX A OF THIS CHAPTER AND IN ACCORDANCE WITH VOLUME V, PART I, CHAPTER 8 OF THIS MANUAL.

13.4 RESPONSIBILITIES.

13.4.1 Type Commanders.

a. Port Engineers and Maintenance Program Managers (MPM) schedule and screen corrosion control work items to the appropriate repair activities during industrial availabilities and upkeeps with sufficient length to accommodate the work.

b. Port Engineers and MPMs screen tank, void and general structural inspection Automated Work Requests (AWR) in Availability Work Packages to the repair activities capable of performing the inspections including in-house Type Commander resources as applicable.

c. When tasked by Port Engineers and MPMs, inspectors and surveyors assigned by Fleet Maintenance Activity/Regional Maintenance Center (RMC)/Type Commander will perform inspections using references (a) and (c). Inspector/surveyor will ensure all inspection data is entered into CCIMS database within three working days upon completion of inspection.

d. (Aircraft Carriers only) Provide to Ship's Force:

(1) Self help information on corrosion control information.

(2) Technical assistance on setting up and updating a ship's Corrosion Prevention and Control Program.

(3) Coordinate and/or provide training in accordance with reference (c) for inspection personnel assigned by the Repair Officer (Ship's Corrosion Control Officer for Aircraft Carriers).

13.4.2 Fleet Maintenance Activity/Regional Maintenance Center.

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 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/RMC, 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.

c. Perform tank, void and general structural inspections as tasked by the Port Engineers and MPMs. Inspections on surface ships and aircraft carriers will use references (a) and (c). Inspector/surveyor will ensure all inspection data is entered into the CCIMS database within three working days upon completion of inspection.

13.4.3 Surface Force Ships and Aircraft Carriers.

a. Set up an ongoing corrosion prevention and control program, including all topside structure, equipment, machinery, fixtures, combat and weapons systems, and components.

(1) For Commander, Naval Surface Force, use reference (d) as guidance.

(2) For Commander, Naval Air Force, use reference (e) Chapter 8 as guidance.

(3) Additional guidance can be found in references (a), (b), Maintenance Index Page (MIP) 1500, MIP 6300 and MIP 6641.

b. Take planned and/or corrective action on all potential discrepancies, and enter all significant discrepancies into the Current Ship's Maintenance Project.

c. Ensure scheduled AWRs requesting tank, void and general structural inspections are conducted by RMC or Type Commander assigned inspectors and surveyors as required by work center Planned Maintenance System. Ensure the AWR includes requirements for cleaning and gas free services as required.

d. (Aircraft Carriers only) Aircraft carrier Type Commanders (TYCOM) shall employ National Association of Corrosion Engineers (NACE) Certified Coating Inspectors to train and assist Ship's Force with coating system inspections and the documentation of these assessments in support of the availability planning process. These inspectors will also provide training in areas of surface preparation, coating selection and application and Quality Control process for the preservation of spaces and equipment by Ship's Force personnel. The overall collection, input and management of the CCIMS database by NACE Certified Coating Inspectors at the TYCOM is required throughout the 32 month availability cycle to fully support Maintenance Program Managers in the life cycle management of shipboard preservation.

e. (Aircraft Carriers only) The Repair Officer is designated as the Ship's Corrosion Control Officer and is responsible to ensure divisions outlined in reference (e) (or series) Chapter 8 are qualified to conduct inspections in accordance with reference (c). All inspection results will be entered into the CCIMS database. Departures From Specifications (DFS) shall be submitted in accordance with this manual and as defined in reference (c). The Repair Office will accomplish a joint inspection with the Supervisor and the Commanding Officer's designated representative (i.e., either Ship's Force personnel or a TYCOM NACE Inspector) upon completion, inspection and acceptance, by the contractor, of work within each compartment.

f. (Aircraft Carriers only) For any tanks and/or voids which are not normally filled with seawater and/or not designed to be exposed to seawater, Ship's Force will ensure the following:

(1) Only fresh water may be used in any tanks and/or voids which are not normally exposed to seawater (e.g., water transferred to peak tanks and/or dry voids for use in controlling list and/or ballasting the ship must be fresh water).

(2) Report to the TYCOM those tanks and/or voids in which fresh water is being used for controlling list and/or ballasting the ship.

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APPENDIX A

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE

NOTE: THIS DECISION TREE DOES NOT CHANGE ANY TECHNICAL REQUIREMENTS. THE LEVEL OF AUTHORITY REQUIRED INDICATES AT WHAT LEVEL AN OUT-OF-SPECIFICATION CONDITION CAN BE APPROVED WHEN PROPERLY DOCUMENTED AND WITH AN ACKNOWLEDGED INCREASE IN THE RISK OF PREMATURE FAILURE. THIS DOES NOT MEAN THAT THE OUT-OF-SPECIFICATION CONDITION WILL NECESSARILY BE ACCEPTED. THE DECISION TO ACCEPT OR REJECT WORK WILL BE MADE BASED ON THE APPLICABLE REQUIREMENTS AND OTHER CONSIDERATIONS.

General Usage of the Table

A. This decision tree does not change any technical requirements. The "Level of Authority Required" indicates at what level an out-of-specification condition can be approved. Mitigation guidance on out-of-specification requirements does not imply that a particular out-of-specification condition will be accepted. The decision to accept or reject an out-of-specification requirement will be made at the level indicted in the table.

B. Minor out-of-specification conditions as described in the columns for "Mitigation Only" and "Local Chief Engineer (CHENG)" in this table represent a low risk of premature coating failure as long as required mitigation actions are taken and the out-of-specification condition is limited with respect to the area being worked. More significant out-of-specification conditions require a formal Waiver/Deviation (Departure from Specification (DFS)) for adjudication of the condition.

C. With the exception of submarines, the "Mitigation Only" category must be adjudicated by the local Technical Authority (shipyard or Regional Maintenance Center engineering code) at the first occurrence of an out-of-specification condition during a particular work item after which the government Quality Assurance (QA) activity/representative can apply the same mitigation guidance for the specified requirement (for submarines, see K, below). Re-occurrences of a previously mitigated condition require documentation at each occurrence (see J, below).

D. All DFSs (minor or major, temporary or permanent) must be adjudicated in accordance with Naval Sea Systems Command (NAVSEA) 5400.95 Enclosure 2.

E. Unless otherwise specified, this table applies only to critical-coated areas.

F. This table does not apply to NAVSEA 08 cognizant spaces as described in NAVSEA Instruction C9210.4, which specifically includes potable water tanks and reserve feed tanks.

G. When using this decision tree for submarine preservation, the local technical authority is required to evaluate the nonconformance in accordance with the appropriate Unrestricted Operation/Maintenance Requirement Card requirements.

H. Repeated waiving of the same out-of-specification requirements shall be cause for the applicator, with the assistance of the local Technical Authority (shipyard or Regional Maintenance Center engineering code), to determine and eliminate the root cause of the noncompliance. If it is determined that the applicator cannot meet the stated requirements, notify NAVSEA accordingly.

I. The local Technical Authority shall decide when multiple out-of-specification conditions or repeated (same) out-of-specification conditions on the same work item warrant a minor or major DFS. In particular, if multiple out-of-specification "Mitigation Only" and/or "Local CHENG" conditions exist and/or affect an area in excess of 0.3% of the total surface area of a work item, the local Technical Authority will submit a minor or major DFS, depending on the severity/risk of the cumulative out-of-specification conditions.

J. Unless otherwise specified, action to "document" an out-of-specification condition requires submittal of the NAVSEA Standard Item 009-32 QA inspection forms (included in the appendices of 009-32). These forms become part of the Objective Quality Evidence and shall be retained.

K. Submarines must document all deviations with the appropriate DFS, no exceptions.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE

TABLE A

Surface Preparation					
		Level of Authority Required			
QA Element	Requirement	NAVSEA Major DFS	DFS	Local CHENG DL/DR/ESR/etc.	Mitigation Only
A. Surface Profile					
1. Critical-Coated Areas (except nonskid)					
a. Average (mils)	2≤ profile ≤4	<2(2)	>6	5≤ profile ≤6	4 < profile <5
b. Individual gage readings (mils)	1≤ gage reading ≤5	<0.6(2)	>6	0.6≤ profile ≤1 and 5≤ profile ≤6	n/a
2. Nonskid (flight deck, hangar bay and weather decks only)					
a. Average (mils)	3≤ profile ≤4.5	<3	>6	4.5< profile ≤6	n/a
b. Individual gage readings (mils)	None	<2	>6	5.5< profile ≤6	n/a
3. QA Readings	(1)	≥10% missing	5%< missing <10%	0%< missing <5%	n/a

Notes:

1. Documentation Requirement: measurements are to be taken in accordance with Method "C" of American Society for Testing and Materials (ASTM) D 4417 with a sampling rate of five (5) readings for the first 1000 ft^2 or portion thereof; two (2) for each additional 1000 ft^2 or portion thereof. For individual areas of less than 25 ft^2 two (2) readings are required. If several small areas are combined on one QA record, at least one (1) tape is required from each area not to exceed five (5) readings per 1000 ft^2. In accordance with Method "C" of ASTM D 4417 one "reading" is defined as the average of three (3) tapes taken in one area.
2. Only when discovered during a record review; otherwise the condition should be corrected as it represents extremely high risk.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE

Surface Preparation
Rationale for Allowing Departure: • ***Profiles below the limit:*** The greatest risk of coating failure due to improper profile is if the profile is insufficient. If an inspection reveals that a profile is too low, local engineering or the inspector shall direct the area to be reblasted. A major departure will be written for a low profile only if the low profile is discovered during a record review. NAVSEA will then be consulted to weigh the various factors contributing to the decision and to determine if the risk of premature failure is justified based on the known schedule impact and cost of rework. • ***Profiles above the limit:*** There is low risk of coating failure due to an excessively thick profile, but it does indicate that Quality Control has failed. With solvent based coatings, however, the risk of solvent entrapment increases with excessive profile as more coating must be applied to cover the high peaks with the proper WFT. Excessive profile may indicate a poor choice of abrasive and typically increases the cost of the job due to additional raw materials (paint and abrasive) and labor hours for blasting and clean up. When Dry-Film-Thickness (DFT) readings are performed per Society for Protective Coatings (SSPC)-PA 2, one of the requirements is to "zero" the gage on a blasted, unpainted area. This ensures that the gage readings reflect the coating thickness above the top of the profile peaks, which ensures that the coating thickness is adequate regardless of the surface profile. **Mitigation:** • When high profiles are allowed, mitigation efforts shall be documented and shall include: increased frequency of WFT gage use, special attention to DFT gage calibration, and increased primer thickness when deemed necessary. For paints with lower solids (e.g., MIL-DTL-24441), additional cure time may be necessary to ensure the complete release of solvent as the film cures.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE

TABLE B

Surface Preparation					
		Level of Authority Required			
QA Element	Requirement	NAVSEA Major DFS		Local CHENG DL/DR/ESR/etc.	
			DFS		Mitigation Only
1. Staining a. SSPC-SP 10, SSPC-WAB 10 (L) and SSPC-SP 12 WJ-2 (L)	random staining of an area ≤5%	n/a	random staining of an area >15%	10%< random staining of an area ≤15%	5%< random staining of an area ≤10%
2. Tightly Adherent Coating(1) a. SSPC-SP 10, SSPC-WAB 10 (L) and SSPC-SP 12 WJ-2 (L)	none remaining	>0.05% remaining or size of largest tightly adherent area >5in^2	Area Affected ≤0.05% *and* Size of Largest Area <5in^2	Area Affected ≤0.02% *and* Size of Largest Area <2in^2	n/a
3. Flash Rusting a. SSPC-WAB 10 (L) and SSPC-SP 12 WJ-2 (L)	flash rust no greater than "L" on entire surface(2)	5%< not "L"	2%< not "L" ≤5%	0.5%< not "L" ≤2%	not "L" <0.5%

Notes:

1. As defined by SSPC-SP 7.

2 NAVSEA allows SSPC-WJ-2 and SSPC-WAB-10 surfaces to flash rust to "L" or "Light" for application of coatings on Naval vessels. SSPC defines flash rust as discoloration that develops within a few hours of completion of blasting as the surface dries. Any rust that develops over several hours or days after the surface has completely dried is defined as rust-back, not flash rust. Immediately after the surface has dried, the amount of flash rust that has developed shall be determined, and shall not be greater than "Light", as defined below. Immediately prior to painting, however, if rust-back has occurred such that rust is present in excess of the amounts allowed by SP-10, WJ-2, or WAB-10 (whether tightly adherent or not), the surface must be re-blasted to remove this rust and bring the surface back into the required condition. Rust-back is also an indication that chlorides remain present on the surface, which will directly negatively impact the final coating system performance, even if the rust itself is tightly adherent.

Surface Preparation

Rationale for Allowing Departure:

- ***Staining:*** Paragraph 5.4.7.3 of NSTM 631 states in part that SSPC-SP-6 (which allows 33% random staining) will result in a degree of cleaning that is adequate for the majority of conventional coating systems under normal exposure conditions. The current requirement for dry abrasive blasted areas is SSPC-SP 10 (which allows 5% random staining) - allowing up to 15% staining with adjudication and mitigation at the local level does not represent a high risk.
- ***Staining and Productivity:*** If a small area of out-of-specification cleanliness is discovered prior to complete cleaning of the tank or area, the inspector or local engineering code normally direct further blasting. If the condition is discovered after completion of the final cleaning, reblasting would normally involve the loss of two to three production days (as much as 60% of the original production blasting cost) to reblast and reclean the area. The cost of reblasting and recleaning generally is not cost effective since the small amount of surface prepared to SSPC-SP-6 is not expected to impact the coating performance.
- ***Tightly Adherent Coating:*** Paragraph 7.2.4.4 of NSTM 631 states in part, "Brush-off blasting (SSPC-SP-7) may be used instead of blasting to bare metal in those instances where an epoxy coating is in good condition and has been applied over a well-prepared surface. This method should result in a surface retaining all paint films, but free from all corrosion products, scale, and foreign matter". SSPC-SP-7 is considered an adequate surface preparation method when the remaining coating is in good condition.
- ***Excessive Flash Rust:*** During preparation of a large area with wet abrasive or Ultra high pressure, some of the adjoining area will flash to "M" or "H". Recovery from flash rusting often requires an effort equivalent to the initial preparation of the surface. In cases where a small area has excessive flash rust bloom adjoining a larger area of acceptable surface, the rework to recover the required surface condition will result in contamination of the adjoining surface with water, "mud" from the removed surface corrosion, grit and dust if an abrasive is used. Once an area is contaminated, the potential to leave some contaminant on the surface is increased, regardless of the recovery actions to clean the surface. The allowance above requires the area to be generally within specification with small areas of flash rusting in excess of "L", resulting in a very low risk of coating failure.

Mitigation:

- ***Tightly Adherent Coating*:** Mitigation of this condition consists of: 1) documenting the size and general location of remaining coating, 2) ensuring that the remaining coating is truly "tightly adherent" as defined by SSPC-SP 7, 3) ensuring remaining coating has a visible profile, and 4) ensuring that the estimates of size and percent area covered are as accurate as possible.
- ***Excessive Staining:*** Documentation of the extent of staining.
- ***Excessive Flash Rust:*** Flash rust must be minimized in areas that are prone to coating failure, e.g., edges, beneath overboard discharges, weld beads, etc. Document extent and location of flash rust.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE

TABLE C

Surface Preparation					
		Level of Authority Required			
QA Element	**Requirement**	**NAVSEA Major DFS**	**Local CHENG DFS**	**DL/DR/ESR/etc.**	**Mitigation Only**
A. Surface Contamination					
1. Conductivity					
a. All Immersed Areas	<30µS	>35µS	30µS< conductivity ≤35µS	n/a	n/a
b. Flight Decks, Weather Decks, Hangar Bay and All Other Areas	<70µS	>85µS	70µS conductivity ≤85µS	n/a	n/a
2. Hydrocarbons					
a. SSPS-SP 1 (before and after surface preparation)	none visible	when mitigation efforts fail and area contaminated >0.03%	when mitigation efforts fail and area contaminated ≤0.03%	n/a	n/a
3. Dust (ISO 8502-3)	dust quantity ≤2 dust particle size ≤2	dust quantity >3 dust particle >3	n/a	2< dust quantity <3 2< dust particle <3	n/a
4. QA Readings	(1)	missing >25%	10%≤ missing ≤25%	missing ≤10%	

Notes:

1. Documentation requirement for conductivity: five (5) readings for each 1000ft^2 of surface being prepared. Documentation requirement for dust test: three (3) tapes for the first 1000ft^2, one (1) tape per 1000ft^2 thereafter, minimum of three (3) tapes per area being preserved.

Surface Preparation

Rationale for Allowing Departure:

- ***Conductivity:*** Excessive chloride contamination can result in blistering of the coating in an immersion area, and can accelerate corrosion under the coating in immersion or non-immersion areas. Because chloride contamination presents a significant risk for premature spot coating failure there is very little tolerance for an out of specification condition. The values that will be resolved by NAVSEA approach a level where premature coating failure may occur, therefore NAVSEA involvement is required to ensure adequate recovery actions, process control and inspection is invoked.
- ***Hydrocarbon Contamination:*** Hydrocarbon contamination on a surface is a more significant cause for premature spot coating failure than chlorides. When contamination is discovered prior to surface preparation or upon completion of surface preparation, the surface will be rejected and recleaned. Local engineering codes and the inspectors will not authorize surface preparation or coating in cases where there is known contamination. The only time a DFS (local or off station) will be processed is if the contaminant is discovered after the surface preparation is completed and there is suspicion that the contaminant has been driven into the surface during surface preparation.
- ***Dust:*** Dust remaining on the surface prior to coating can significantly impact the long-term adhesion of the coating. The rationale for the high percentage of missing readings allowed prior to NAVSEA involvement is that normally very few readings are required. 25% missing readings may be only 1 reading less than the required number of readings.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE

TABLE D

Surface Preparation and Coating Application					
QA Element	**Requirement**	**Level of Authority Required**			
		NAVSEA		**Local CHENG**	
		Major DFS	**DFS**	**DL/DR/ESR/etc.**	**Mitigation Only**
A. Environmental Conditions (times are cumulative)					
1. % Relative Humidity					
a. Tanks	RH ≤50%	>55% for >2 hours	n/a	50%< RH ≤55% for ≥2 hours	50%< RH ≤55% for <2 hours
b. Other Areas	RH ≤85%	>90% for >2 hours	n/a	85%< RH ≤90% for ≥2 hours	85%< RH ≤90% for <2 hours
2. Substrate Temperature					
a. High, Out of Specification	varies by application	temperature during painting *or* curing >110% of maximum allowed(3)	n/a	100%< temperature during painting *or* curing ≤110%(3)	n/a
b. Low, Out of Specification	varies by application	temperature during painting *or* curing <90% of minimum required(3)	n/a	90%≤ temperature during painting *or* curing <100% with no mitigation(2, 3)	90%≤ temperature during painting *or* curing <100%(3)
c. Flight Deck Temperature	varies by application	any noncompliance	n/a	n/a	n/a
d. At or Close to Dew Point	substrate temperature >5°F above the dew point	at or below dew point during painting *or* curing	n/a	temperature <5°F above the dew point with no mitigation(2)	temperature <5°F above the dew point (*not* allowed on submarines)
3. QA Readings	(1)	missing >25%	10%< missing ≤25%	missing ≤10%	n/a

Surface Preparation and Coating Application

Notes:

1. Varies by application, review technical documentation for specific documentation requirements.
2. This would occur when the condition was discovered during a record review of completed or in-process preservation.
3. Temperature in °F only.

Rationale for Allowing Departures:

- ***Substrate Temperature:*** When the substrate temperature is out of specification (except for high temperature), additional cure time within specification can be added prior to application of the next stripe or full coat of paint to mitigate "out of specification" conditions (additional cure time required is the amount of time the environmental conditions were out-of-specification). This additional cure time must be documented properly. Additional cure time after application of a subsequent coat of paint does not satisfy the curing requirement. For excessive temperature conditions, local engineering resolution is required.

Mitigation:

- ***Substrate Temperature, At Or Close To Dew Point:*** Painting or blasting when the substrate temperature is less than 5°F above the dew point may be acceptable in some circumstances, e.g., during the early morning when temperatures are clearly rising. Proper mitigation for this condition is a documented increase in dew point/substrate temperature measurement to ensure that the substrate temperature does not fall below the dew point and frequent visual inspection to ensure that moisture has not condensed on the surface.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE

TABLE E

Coating Application					
QA Element	**Requirement**	**Level of Authority Required**			
		NAVSEA		**Local CHENG**	
		Major DFS	**DFS**	**DL/DR/ESR/etc.**	**Mitigation Only**
A. Receipt Inspection	(1)	product applied, no receipt inspection possible	n/a	coating applied and sufficient coating remaining to perform receipt inspection	n/a
B. Shelf Life	verify coating shelf life not expired prior to application of coating	product applied, no shelf life extension possible	n/a	coating applied and sufficient coating remaining to perform shelf life extension inspection	n/a
C. Mixing (mixing temperature and ratio)					n/a
1. All Paint (except nonskid)	varies by application	improperly mixed or off-ratio paint applied	n/a	mixing temperature out of- specification(2)	n/a
2. Nonskid	varies by application	any noncompliance	n/a	n/a	n/a

Notes:

1. Receipt inspection requirements: 1) surface ships require Certificate of Conformance for all coatings, and 2) submarine requirements are covered in NSTM Chapter 631, Table 11-1.

2. This would occur when the condition was discovered during a record review of completed or in-process preservation.

Rationale for Allowing Departure:

• ***Shelf Life:*** Coatings must be certified based on receipt inspection for submarines per NSTM Chapter 631, or based on receipt inspection or a Certificate of Compliance for surface craft per SI 009-32. In some cases due to logistical problems the coating is received without receipt inspection, or with an expired shelf life, just prior to when it must be applied.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE
TABLE E (CON'T)

Coating Application					
		Level of Authority Required			
		NAVSEA		Local CHENG	
QA Element	**Requirement**	**Major DFS**	**DFS**	**DL/DR/ESR/etc.**	**Mitigation Only**
D. DFT (measured IAW SSPC-PA 2)					
1. Ultra-High Solids (UHS) Coatings (per coat or full system)(3)	varies by application	overall average coating applied >30mils	system maximum< overall average coating applied ≤30mils	localized average coating applied ≤50mils on ≤20% of the surface(2) *and* area covered by runs, drips, and sags >1% *or* of thickness >50mils	area covered by runs, drips, and sags ≤1% of thickness ≤50mils
2. Solvent Based Coatings (per coat or full system)(3)	varies by application	measured DFT >150% of maximum allowed	n/a	100%< measured DFT ≤150% of maximum allowed	n/a
3. All Coatings					
a. Total System	varies by application	low, out-of-specification	n/a	n/a	n/a
b. Individual Coat DFT	varies by application	n/a	n/a	low, out-of-specification	
4. QA Readings	(1.)	missing >25%	0%< missing ≤25%	n/a	n/a

Notes:

1. SSPC-PA 2 requires five (5) DFT measurements over the first 100 ft^2, and, for areas up to 300 ft^2, each 100ft^2 area shall be measured. For areas up to 1000ft^2, three (3) 100ft^2 areas shall be measured. For areas larger than 1000ft^2, measure three (3) 100ft^2 areas in the first 1000ft^2, and one (1) 100ft^2 for each additional 1000ft^2 thereafter.
2. This is intended to allow for film thickness variations caused by stripecoating and overspray during coating adjacent areas, not for poor workmanship.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE

Coating Application

Notes:

3. Film thickness indicated does not include stripe coat thickness unless specifically referenced.

Rationale for Allowing Departure:

- ***High Solids Coatings:*** Currently NSTM 631 Table 11-1 Note 7 allows coatings to be applied to 150% of the required coating thickness. Based on discussions with representatives, "required" thickness refers to the range if a range is stated. The result is that coatings can be applied up to 150% of the maximum range identified by the manufacturer. This interpretation has been common practice by the Naval Shipyards as well as contractors, in accordance with the understanding stated above with NAVSEA.
- ***Solvent Based Coatings:*** For solvent-based coatings there is a potential for solvent entrapment when a coating is applied at a higher DFT than the manufacturer recommends. The change in interpretation requires closer control for excessive thickness of solvent-based coatings. The risk of solvent entrapment may be mitigated by ventilation, temperature, humidity and the amount of cure time between coats. The new interpretation is somewhat more restrictive for solvent-based coatings, and requires engineering review if the coating is not applied within manufacturer's recommendations.

Mitigation:

- ***High DFT Readings:*** Mitigation of high DFT values is mitigated by taking additional DFT readings (as necessary) to identify the extent of the nonconforming condition, documenting these findings, reducing the thickness of follow-on coats when appropriate, and increased attention to application processes (nozzle sizes, stand-off distances, etc.) to prevent recurrence.

Coating Application					
		Level of Authority Required			
		NAVSEA		Local CHENG	
QA Element	Requirement	Major DFS	DFS	DL/DR/ESR/etc.	Mitigation Only
E. Overcoat Window	see ASTM F-718 datasheet	time for cure insufficient *or* >125% of maximum time allowed	time for cure insufficient *or* 115%< of maximum time allowed ≤125%	time for cure insufficient *or* 100%< of maximum time allowed ≤115%	n/a
F. Cure to Service	see ASTM F-718 datasheet	insufficient	n/a	n/a	n/a
G. Amine Bloom					
1. Prime, Intermediate or Stripe Coat	none present	no corrective action taken	n/a	corrective action taken	n/a
2. Topcoat	n/a	n/a	n/a	condition documented	n/a

Rationale for Allowing Change:

- ***Overcoat Windows:*** Temperature changes during curing can change the minimum and maximum overcoat windows. Local engineering oversight is directed for overcoat window problems because often the contractor or paint shop believes that there is an overcoat window problem in cases where close scrutiny of the environmental records show that there is additional overcoat window remaining. If there is an overcoat window problem the recovery may be to solvent wipe the coating, abrade the coating, or abrasive blast the coating. The local engineering code is to consult with the coating manufacturer to determine the appropriate recovery action, if recovery is possible.

PRESERVATION DEPARTURES FROM SPECIFICATIONS PROCESS DECISION TREE
TABLE F

Surface Preparation					
		Level of Authority Required			
		NAVSEA		Local CHENG	
QA Element	Requirement	Major DFS	DFS	DL/DR/ESR/etc.	Mitigation Only
A. Blasters	SSPC-C 7	no certification	out of date certification	n/a	n/a
B. Equipment Operators and Sprayers Utilizing Plural Component Equipment	MPCAC	no certification	out of date certification	n/a	n/a
C. Contractors Performing Preservation Work	QP-1	no certification	out of date certification	n/a	n/a
D. Coating Inspectors	NPBI or NACE CIP Level 1	no certification	out of date certification	n/a	n/a

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
(c) OPNAVINST 4440.19F - Policies and Priority Rules for Cannibalization of Operational Equipment and Diversion of Material at Contractor Plants to Meet Urgent Operational Requirements

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 and Type Commander (TYCOM) cannibalization reporting requirements.

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 TYCOM's 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 is 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 be sufficient cause to justify active ship cannibalization.

e. Immediate Superiors in Command (ISIC) will normally initiate the cannibalization when special circumstances or urgent operational commitments exist.

14.3.1 Commander Naval Surface Force Ships.

a. Cannibalization Not Involving Ships in Overhaul. When a system asset is not available and if the degree of readiness degradation (normally a CASREP) warrants such action, the only remaining alternative is to cannibalize from an active ship. Approval of active ship cannibalization request (not involving ships in overhaul) required to satisfy CASREP requirements will be authorized by the appropriate TYCOM.

b. Cannibalization Involving Ships in Availabilities. Cannibalization from ships in availabilities will be minimized since such actions often affect maintenance/operational schedules for several ships. Cannibalization may be initiated only after non-availability of materials through the supply system or alternate sources has been ascertained. Cannibalization from ships in overhaul/availability must be approved through the appropriate TYCOM. Requests must be submitted via the normal chain of command.

c. COMNAVSURFLANT/COMNAVSURFPAC (N43) and (N4111) will be included as information addressees for tracking purposes on all cannibalization request and approval messages.

14.3.2 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.

14.3.3 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 with specific reporting requirements. This format must be utilized when requesting cannibalization.

f. (Surface Force only) Initiate an active ship cannibalization request via naval message. Cannibalization message should be addressed to approving authority as outlined in paragraph 14.3.1a. of this chapter. Appendix A of this chapter contains a sample cannibalization message.

g. (Submarines only) INFO the following Plain Language Address Directory (PLAD) for all components that have a Last Maintenance Action Date assigned in the Planned Maintenance Requirements Inventories and Schedule: SUBMEPP PORTSMOUTH NH//DDS/ASDS/SS//.

14.5 SHIP'S RESPONSIBILITIES.

14.5.1 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.

14.5.2 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.

14.6 SURFACE FORCE SHIPS' SPECIFIC INSTRUCTIONS.

14.6.1 Immediate Superior In Command. When assigned, the ISIC/TYCOM will perform the actions listed below.

a. Ensure the criteria, specific reporting requirements and proper naval message format for active ship cannibalization has been met.

b. Nominate possible sources of cannibalization from ships within the force.

c. If acting as approval authority in accordance with paragraph 14.3.1a. of this chapter, 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.

d. Request authorization from the approving activity, as appropriate, to cannibalize from a ship within the force by endorsing the ship's request for cannibalization via routine message.

e. Transmit approval/disapproval message if acting as approval authority in accordance with paragraph 14.3.1a. of this chapter.

14.6.2 Type Commander.

a. Monitor and track all cannibalization actions being carried out by subordinate units.

b. If cannibalization is not feasible from a ship within the force, request assistance from other TYCOMs.

c. Submit quarterly cannibalization report to United States Fleet Forces Commander per Congressional requirements.

d. Ensure the criteria, specific reporting requirements and proper naval message format for active ship cannibalization has been met.

14.7 PROCEDURES. The following procedures apply when cannibalization is authorized:

14.7.1 Type Commander.

a. Monitor all cannibalization actions being carried out by subordinate units.

b. Adjudicate and authorize/disapprove all requests for inter-ISIC cannibalizations from ships within the force and provide direction concerning the method of payback to the cannibalized ship.

c. If cannibalization is not feasible from a ship within the force, request assistance from other TYCOMs.

d. Meet the reporting requirements contained in reference (c) by producing a monthly cannibalization report (format/template to be provided by U.S. Fleet Forces Command N41). This monthly cannibalization report is due to the Deputy Chief of Staff, Fleet Ordnance and Supply (N41), U.S. Fleet Forces Command no later than the 10th of the following month.

14.7.2 Immediate Superior In Command. When assigned, the ISIC/TYCOM will perform the actions listed below..

a. Authorize the cannibalization when the transfer and receiving ships have the same ISIC. 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. Monitor the delivery of cannibalized part(s) to the ship to ensure the parts are received as soon as possible.

c. Request the appropriate Regional Maintenance Center to assist in performing the cannibalization, to include the removal of the cannibalized parts and providing rigging services, as appropriate.

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)
NAVSUP WEAPONS SYSTEMS SUPPORT MECHANICSBURG PA//
(APPROPRIATE RMC AND/OR RMC DET)
SUBMEPP PORTSMOUTH NH//. (para 14.4.1.f)
USS (SHIP'S NAME AND HULL NO.)//(CANNIBALIZED SHIP PLAD)
BT
UNCLAS //N04400//
PASS TO OFFICE CODES: (AS APPROPRIATE)
SECINFO/U/-//
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/COMUSFLTFORCOMINST 4790.3//
REF/C/DOC/OPNAVINST 4440.19F//
NARR/REF A IS PROCEDURE FOR INITIAL CASREP/REF B IS JOINT FLEET MAINTENANCE MANUAL VOLUME VI, CHAPTER 14 PROVIDING TYCOM POLICY ON ACTIVE CANNIBALIZATION/REF C IS POLICIES AND PRIORITY RULES FOR CANNIBALIZATION OF OPERATIONAL EQUIPMENT AND DIVERSION OF MATERIAL AT CONTRACTOR PLANTS TO MEET URGENT OPERATIONAL REQUIREMENTS.//
RMKS/1. TO CORRECT CASREP IAW REF A ON BOARD USS (CANNIBALIZING SHIP'S NAME AND HULL NO.)
REQ ACTIVE SHIP CANNIBALIZATION PER REF B AND REPORT CANNIBALIZATION DATA IAW REF C. FOLLOWING MATERIAL REQUIREMENT APPLIES PER CANNIBALIZATION REQUISITION:

A. REQUISITION NUMBER (UIC-JULIAN DATE-SERIAL NUMBER)
B. EQUIPMENT NOMENCLATURE/EQUIPMENT IDENTIFICATION CODE (EIC)
C. CASREP SERIAL NUMBER
D. COG SYMBOL/NSN/FSCM-PART NUMBER/NOMENCLATURE
E. APL NUMBER.
F. CIRCUIT SYMBOL (IF APPLICABLE OR N/A)
G. (QTY REQUIRED)/(QTY ALLOWED)/(QTY ON HAND).
H JOB CONTROL NUMBER (JCN) USED IN THE CASREP PARTSID/DATA SET
I. PART CARRIED ONBOARD (OPERATIONAL UNIT), YES OR NO
J. PART AVAILABLE IN SUPPLY SYSTEM (WHOLESALE), YES OR NO
K. PART SUPPORTS INTERMEDIATE MAINTENANCE OR REPAIR, YES OR NO
L. REASON PART NOT IN STOCK AT OPERATIONAL UNIT (E.G., CONSUMED, INSUFFICIENT QUANTITY, NOT CARRIED, ETC.)
M. REASON FOR NOT REPLENISHING (E.G., INSUFFICIENT FUNDING, NOT CARRIED, ETC.)

2. SUGGESTED SOURCE IS USS (CANNIBALIZED SHIP'S NAME AND HULL NO.) IF PAYBACK IS REQUIRED USE REQUISITION NUMBER (CANNIBALIZING SHIP'S NAME AND HULL NO.) DATE (DAY, MONTH, YEAR).
3. CANNIBALIZATION ACTION NECESSARY FOR USS (CANNIBALIZING SHIP'S NAME AND HULL NO.) TO MEET JUSTIFICATION //
BT
NNNN

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

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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 V3 (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 AN 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) NAVSEA S6161-Q5-CAT-010 - Naval Shipboard Food Service Equipment Catalog
(d) NAVSEA S6152-B1-CAT-010 - Laundry and Dry Cleaning Equipment Catalog
(e) NAVSEAINST C9210.4 - Changes, Repairs and Maintenance to Nuclear Powered Ships
(f) NAVSEAINST 9210.14 - Changes to Submarine Tenders and Destroyer Tenders with Nuclear Support Facilities, Requirements Concerning
(g) NAVSEA SL720-AA-MAN-030 - Navy Modernization Process Management and Operations Manual
(h) COMNAVAIRFORINST 9640.1 - Control of Habitability Improvements in Aircraft Carriers

LISTING OF APPENDICES.

A Table of Habitability Project Technical Requirements and Actions
B Sample Habitability OPTAR Augment Funding Request
C Advance Planning Milestones

16.1 PURPOSE. To provide guidance in the requirements for implementing various habitability programs, and to identify the sources of assistance available for these programs.

16.1.1 Policy. The Chief of Naval Operation's 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, food service equipment and laundry equipment shall conform to references (b), (c) and (d).

c. Unauthorized alterations and rearrangements are prohibited.

d. Changes to spaces or systems covered by references (e) and (f) shall be approved by Naval Sea Systems Command (NAVSEA) and conform to the requirements of Chapter 3 section 3.8 of this volume.

e. (Surface Force Ships and Aircraft Carriers only) All changes to Ship Configuration as a result of habitability improvements, repair or replacement, regardless of the accomplishing activity, must meet the requirements of reference (g), Section 2 and Appendix A of this chapter.

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, not to exceed $25,000 per project, 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. These modifications include alterations which affect compartment size or location, adding 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, etc. which are available via the Regional Maintenance Center (RMC)/Immediate Superior In Command (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 B of this chapter provides a sample request letter.

16.2.2 Habitability Programs Under the Technical Sponsorship of Naval Sea Systems Command. These are programs under various titles that have evolved from the NAVSEA Habitability Program originally established in 1975. The common program element is approved NAVSEA title block drawings that define the scope and details for projects accomplished there under. These formalized programs are executed in accordance with long range plans with the established goal of achieving and maintaining the Habitability Standards promulgated by reference (a) over the life of each ship.

a. The TYCOM shall authorize and fund individual habitability upgrade/refurbishment projects. For aircraft carriers, projects are in accordance with reference (h). Contractor services may be utilized for design and engineering support, procurement development and monitoring, and on board installation support. Installation support may be provided in the form of a Customer Contract Team (CCT) that accomplishes the full scope of the project or as professional technical advisor who assists untrained and inexperienced Ship's Force personnel with accomplishment of the work.

b. The TYCOM is responsible for developing and maintaining the long range five-year NAVSEA Habitability Life Cycle Program plan. Ships are selected for initial induction into the Program based on years in-service. Specific ensuing projects are based on non-compliance with criteria specified by reference (a), the general scope of habitability deficiencies as noted by the Board of Inspection and Survey, planned life cycle furniture replacement schedules, and other available documentation. Ship's Force input is encouraged.

c. Design surveys are normally accomplished during Chief of Naval Operation's maintenance availabilities. Follow-on installation projects will be scheduled during subsequent maintenance availabilities until all designated compartments in each ship have been upgraded or received new furniture. Once all the designated compartments in any ship have been upgraded or refurnished, the process will repeat itself. That is, each compartment, after the initial upgrade, will be, in accordance with the TYCOM life cycle plan, scheduled for second and subsequent upgrades at specified intervals until such time that ship is removed from the program pending decommissioning.

d. While the routine replacement of habitability hardware usually does not generate the requirement for changes to arrangements for ventilation, power and lighting, steam, support foundations, etc., more extensive projects such as upgrades may well generate these requirements. Where these changes result in requirements to increase the capacity of the "hotel" systems providing support, a concurrent Ship Change Document (SCD) in accordance with reference (g) for upgrade of the "hotel" systems must be executed at TYCOM expense concurrent with the individual Program project. More detailed guidance in this area is provided by Appendix A of this chapter. Verification of whether or not SCDs are required to support individual projects may be made via the following TYCOM Codes:

(1) COMNAVAIRPAC Shipboard Habitability Manager, Code N434A8.

(2) COMNAVAIRLANT Shipboard Habitability Manager, Code N431HE.

(3) COMNAVSURFPAC Shipboard Habitability Manager, Code N43TH.

(4) COMNAVSURFLANT Shipboard Habitability Manager, Code N436E6.

e. 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.

(5) Laundry Spaces

f. Per the authority of reference (a), the TYCOM may task and fund various agents including an RMC to accomplish the following:

(1) Design habitability improvements for accomplishment by Forces Afloat or a CCT.

(2) Procure installation materials.

(3) Perform other management and engineering services.

(4) Provide installation or installation support services.

16.2.2.1 Program Responsibilities.

16.2.2.1.1 Chief of Naval Operations.

a. Authorize Program.

b. Establish shipboard habitability standards based on recommendations of Habitability Working Groups.

16.2.2.1.2 Naval Sea Systems Command.

a. Establish technical policy.

b. Approve furnishings, fixtures, materials, food service equipment and laundry equipment.

c. Develop installation procedures.

16.2.2.1.3 Type Commander.

a. The Habitability Program Manager shall follow the Technical Requirements of Appendix A.

b. Develop the Long Range Plan and establish priorities for attainment of standards. Provide these plans to the appropriate Expanded Planning Yard (EPY) updating plans as required.

c. Plan, schedule, coordinate and monitor projects.

d. Authorize, budget and fund the Program.

16.2.2.1.4 Regional Maintenance Center or Other Agent as Tasked and Funded by Type Commander.

a. Solicit, award and administer contracts to support Program requirements for design, engineering and technical support and installation. Perform the duties of a Contracting Officer's Representative for the monitoring and oversight of Program contractors.

b. Provide project coordination throughout the life of each project.

c. Provide liaison with Fleet and TYCOMs, COMNAVSEASYSCOM, Naval Surface Warfare Center, Carderock Division (NSWCCD) In-Service Engineering Agents (ISEA)/Life Cycle Managers (LCM), Planning Yards, other RMCs and other naval activities.

d. Upon induction of the first ship of each class into the Program, submit preliminary habitability space arrangement concepts or drawings to COMNAVSEA's NSWCCD 974 ISEA/LCM for verification of conformance to applicable ship habitability specifications and criteria (e.g., reference (a)). Submittal of concepts or drawings for follow-on ships of the class is not required, unless different space arrangements are proposed. Submit final habitability space arrangement drawings for NSWCCD 974 ISEA review (prior to Planning Yard signature).

e. Prepare, approve or task approval by the EPY NAVSEA drawings for the Program as required by Appendix A of this chapter. Provide copies of locally approved drawings to the EPY. (For nuclear-powered ships, drawings are submitted to the Hull Planning Yard/Reactor Planning Yard for review and approval.)

f. Maintain a chronological record of all projects accomplished on each ship from the induction of the ship into the Program through decommissioning. This record includes initial ship check data, copies of all installation drawings, red-line drawings (if any) and other pertinent data.

g. Identify and oversee the procurement of all required installation material. Maintain a material commodity database identifying all material approved for use under the Program.

h. Prepare and update procurement specifications for habitability material.

i. Identify requirements for Indefinite Delivery Indefinite Quantity Contracts to provide material for frequently used material items. (Contracts are normally awarded and administered by the Fleet and Industrial Supply Centers.)

j. Operate material staging centers for the receipt, staging and shipping of project material.

k. Perform quality assurance checks at material staging centers and onboard ships of new material and hardware. Prepare Quality Deficiency Reports and Reports of Discrepancy on requisitioned material as needed.

l. Provide administrative assistance to the TYCOM in the preparation of long range habitability improvement plans and related correspondence.

m. Maintain a habitability website to facilitate the dissemination of Program information.

n. Respond to fleet requests for habitability assistance or support.

o. Use NSWCCD 974's web site to access Navy approved furniture, food service and laundry equipment of references (b), (c) and (d) at: https://90machinery.navsses.navy.mil/habitability/.

p. When required, request NSWCCD 974 ISEA/LCM support for approval of alternative food service/laundry equipment and furniture not found in references (b), (c) and (d). When required, request NSWCCD 974 ISEA/LCM to conduct equipment selection/evaluation and testing. Also, request NSWCCD 974 support for equipment Integrated Logistics Support packages (parts support via Allowance Parts Lists, Tech Manuals and Maintenance Index Pages/Maintenance Requirement Cards) and Coordinated Shipboard Allowance List support.

16.2.2.1.5 Supply Activity.

a. Prepare, contract, and procure materials.

b. Administer other associated contracts.

16.2.2.1.6 Ship Commanding Officer. (When projects are accomplished by Ship's Force.)

a. Assign project manager and petty officer supervision for projects.

b. Assign an adequate labor force for removal, space preparation, installation and required fire watches working under technical advisor supervision.

c. Conduct training programs.

d. Account for, coordinate all movement of, and store all project material as it is received on board.

e. Coordinate all required tag-out/in paperwork and Work Authorization Forms.

f. Dispose of all retrograde material generated by the project.

g. Report changes affecting repair parts support to Naval Inventory Control Point. Technical data will be provided to the ship by the Agent preparing installation drawings.

h. Report completion to the TYCOM with summary of lessons learned.

i. Ensure Ship's Selected Records are updated, as appropriate. Technical data will be provided to the ship by the Agent preparing installation drawings.

16.2.2.2 Project Milestones. Advanced Planning milestones for scheduled projects are listed in Appendix C of this chapter for aircraft carriers and submarine forces and Volume II, Part II, Chapter 2, Appendix D of this manual for surface force ships.

16.2.2.2.1 Advance Planning Notice (Surface Force Ships only). This TYCOM generated notice identifies Projects proposed for accomplishment, and provides work scope details including, if applicable, Ship's Force manpower requirements. This notice also requests Commanding Officer's comments, concurrence, and commitment of resources to the proposed projects.

16.2.2.2.2 Advance Planning Notice (Aircraft Carriers only). Habitability projects are entered into the Availability Work Package. Volume II, Chapter 3 of this manual provides guidance in the development and revision of the Availability Work Package.

16.2.2.2.3 Project Confirmation Notice. 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.

16.2.2.2.4 Project Authorization. (Applicable to projects accomplished by Ship's Force.) 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 Project Completion Report. (Applicable to projects accomplished by Ship's Force.) 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. Completion letters on all authorized projects should be forwarded via the chain of command to the TYCOM.

16.2.2.4 Integrated Logistics Support Reporting. For projects accomplished by Ship's Force, the ship is responsible for submitting any necessary OPNAV 4790/CK forms for Coordinated Shipboard Allowance List support. Technical data will be provided to the ship by the Agent preparing installation drawings. For projects accomplished by a CCT, the requirements of NAVSEA Standard Item 009-21 shall be invoked.

16.3 NEW CONSTRUCTION SHIPS. U.S. Navy ships are built to meet the 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 AIRPAC/LANT SPECIFIC HABITABILITY IMPROVEMENT PROGRAMS.

16.4.1 Aircraft Carrier Climate Control Improvement Team.

a. The Aircraft Carrier Climate Control Improvement 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 every 12 to 15 months, but no greater than 24 months.

b. 30 days prior to the visit, the ship will provide a list of 50 spaces the ship requests to be inspected to the Commander, Naval Air Force Program Manager. 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 machinery spaces.

   (5) Food Device and Laundry Spaces.

c. During the visit, the team will provide On the Job Training for Ship's Force, 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. All corrected and uncorrected discrepancies identified during each survey will be submitted in electronic format (M0001 file) for submission into the ship's CSMP. The TYCOM will utilize this report to conduct follow-up shipchecks to track completion of discrepancies.

16.4.2 Food Service and Laundry (Commander Naval Air Force Pacific)/Enhanced Quality Of Life Program (Commander, Naval Air Force Atlantic).

a. The Food Service and Laundry (FS&L) and the Enhanced Quality Of Life (EQOL) Programs were 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 FS&L/EQOL programs are a cooperative teaming effort involving the Aircraft Carrier TYCOM and Ship's Supply Department. The TYCOM will provide program management, labor funding and administer material procurement. The TYCOM will provide funding and oversight for material procurement. Ship's Force is instrumental in determining the requirements and opportunity for correction of material deficiencies. The FS&L/EQOL programs key objectives are:

(1) Advance planning.

(2) Technical expertise and continuity.

(3) Standardization of approved shipboard food service/laundry equipment.

(4) Achievement of full Allowance Parts List supportability.

(5) Maintenance and grooming support planning.

(6) Maintenance training for Ship's Force personnel.

c. The replacement of food service or laundry equipment usually does not generate the requirement for changes to arrangements of ventilation, electrical, piping systems, and support foundations, etc. However, where changes result in net compartment increase to the capacity of the "hotel" systems providing support, or change the physical configuration of the ship's structure, an SCD in accordance with reference (g) for upgrade of the "hotel" systems must be executed at TYCOM expense . The FS&L/EQOL programs are not intended to supplant the SHIPMAIN Entitled Process. All equipment replacements will consist of equipment that has been approved for shipboard use in accordance with references (b), (c) and (d) or by NSWCCD 974 ISEA/LCM, including the interchangeability of like equipment.

d. Not all food service or laundry equipment falls within the purview of the FS&L/EQOL programs. Items of the following nature are not within the scope of this program.

(1) Repair/replacement of non-approved equipment.

(2) Unauthorized modifications or alterations. These modifications include alterations which affect compartment size or location, adding false bulkheads, overheads, or new equipment not previously installed.

(3) Normal ship maintenance and organizational repair responsibilities.

(4) Deck coverings in spaces other than food service and laundry spaces.

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TABLE OF HABITABILITY PROJECT TECHNICAL REQUIREMENTS AND ACTIONS

REQUIREMENT ATTRIBUTE	HABITABILITY IMPROVEMENT PROJECT TYPE			MODERNIZATION SCD REQUIRED	MINIMUM ACTION REQUIRED
	REPAIR	UPGRADE	REPLACEMENT		
Requires change in berthing capacity below CNO requirements		X	X	X	Process and execute SCD
Requires new berthing arrangement or design within existing compartment		X	X		For non-nuclear powered ships, provide drawings to Planning Yard. For nuclear powered ships, comply with NAVSEAINST C9210.4A.
Requires new Head arrangement or design within existing compartment		X	X		For non-nuclear powered ships, provide drawings to Planning Yard. For nuclear powered ships, comply with NAVSEAINST C9210.4A.
Requires new Lounge Area arrangement or design within existing compartment		X	X		For non-nuclear powered ships, provide drawings to Planning Yard. For nuclear powered ships, comply with NAVSEAINST C9210.4A.
Replace lockers, berths, furniture, fixtures, food service or laundry equipment of exact same design within same frames, power supply and footprint	X				Use existing drawings to generate Bill of Material
Requires increased ventilation capacity to compartment		X	X	X	Process SCD, install in conjunction with Habitability Improvement Project
Requires rerouting of ventilation within existing capacity		X	X		For non-nuclear powered ships, provide drawings to Planning Yard. For nuclear powered ships, comply with NAVSEAINST C9210.4A.
Requires increased electrical capacity to compartment		X	X	X	Process and execute SCD
Requires use of spare breaker		X	X		Task Expanded Planning Yard to review and approve drawings

TABLE OF HABITABILITY PROJECT TECHNICAL REQUIREMENTS AND ACTIONS

REQUIREMENT ATTRIBUTE	HABITABILITY IMPROVEMENT PROJECT TYPE			MODERNIZATION SCD REQUIRED	MINIMUM ACTION REQUIRED
	REPAIR	UPGRADE	REPLACEMENT		
Requires rerouting of electrical cables within existing capacity		X	X		For non-nuclear powered ships, provide drawings to Planning Yard. For nuclear powered ships, comply with NAVSEAINST C9210.4A.
Requires increased steam capacity, chill water capacity, etc. to compartment		X	X	X	Process and execute SCD
Requires rerouting of steam piping, chill water piping, etc. within existing capacity		X	X		For non-nuclear powered ships, provide drawings to Planning Yard. For nuclear powered ships, comply with NAVSEAINST C9210.4A.
Requires modification of living space sprinkler system within existing capacity		X	X		For non-nuclear powered ships, provide drawings to Planning Yard. For nuclear powered ships, comply with NAVSEAINST C9210.4A.
Requires additional sprinkler heads(s) to maintain adequate coverage (Per PY review)		X		X	Process SCD, install in conjunction with Habitability Improvement Project

APPENDIX B

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, DSN/Comm telephone number, email address, etc.)

COPY TO:
ISIC (as appropriate)

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APPENDIX C

ADVANCE PLANNING MILESTONES

MILESTONE (A-MO)	ACTION	EVENT
A - 23	TYCOM	ESTABLISH PLANNING ESTIMATE. TASK RMC WITH DESIGN SHIPCHECK
A - 22	RMC or AGENT	SHIP VALIDATION AND COMMENCE DESIGN
A - 14	TYCOM	SEND HABITABILITY PROJECT ADVANCE PLANNING NOTICE (SURFACE SHIPS)
A - 13	SHIP	INDICATE CONCURRENCE/COMMITMENT TO PROJECT(S) TO TYCOM. ENTER PROJECTS(S) IN CSMP
A - 12	TYCOM	CONFIRM PROJECT
A - 9	TYCOM (AIRCRAFT CARRIERS)	ENTER PROJECTS IN AVAILABILITY WORK PACKAGE (AWP)
A - 8	PMS 312C (CVNs)/SHIP/TYCOM (AIRCRAFT CARRIERS)	PROJECT REVIEW CONFERENCE (PRC)
A - 8	RMC or AGENT	PREPARE SPECIFICATION DEVELOPMENT PACKAGE AND FORWARD TO APPROPRIATE PLANNING ACTIVITY
A - 8	RMC or AGENT	PREPARE MATERIAL REQUISITIONS
A - 7	RMC or AGENT	SEND REQUISITIONS TO FLEET AND INDUSTRIAL SUPPLY CENTER
A - 6	RMC or AGENT (SURFACE SHIPS)	ISSUE DRAWINGS TO EPY
A - 2	RMC or AGENT/SHIP	PROJECT KICK-OFF BRIEFING
A	SHIP or RMC AGENT	START AVAILABILITY/PROJECTS
COMP	SHIP (APPLICABLE TO PROJECTS ACCOMPLISHED BY SHIP'S FORCE)	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 all classes of ships that are outfitted with Impressed Current Cathodic Protection (ICCP).

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 ICCP systems shall submit logs monthly 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 the Cathodic Protection In-Service Engineering Activity (Naval Surface Warfare Center, Carderock Division (NSWCCD), Philadelphia Code 614). NSWCCD will review the ICCP log data and provide an electronic mail response to each ship within 15 working days indicating log receipt and system operational status.

17.2.2 Naval Air Force Ships. All aircraft carriers with installed ICCP systems shall submit logs monthly per reference (a), using NAVSEA Form 9633/1 or equivalent, to the Cathodic Protection In-Service Engineering Activity (NSWCCD, Philadelphia Code 614) no later than 15 days after the last day of the reporting month. NSWCCD will review the ICCP log data and provide a naval message response to each ship within 15 working days indicating ICCP log receipt and system operational status.

17.2.3 Submarine Force Ships. All submarines with installed ICCP systems shall submit quarterly logs per reference (a), using NAVSEA form 9633/2 or equivalent to NSWCCD Philadelphia Code 614 via message no later than 10 days after the last day of the reporting quarter (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.

VOLUME VI

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, MK6, MK7 and MK8 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 Publication 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 United States Fleet Forces Command Maintenance Officer is responsible for establishing policy guidelines for the program. Policy will be disseminated to the Fleet and Naval Sea Systems Command (NAVSEA) certified Regional Maintenance Centers (RMC) for scheduling, planning, conducting Planned Maintenance System (PMS) recertification of fleet assets and management of life raft contingency pools. Commander Naval Surface Force Atlantic (Code N434) and Commander Naval Surface Force Pacific (code N4344) are designated Fleet Life Raft Program Managers.

18.2.1 Types of Inflatable Life Rafts. There are 5 basic Navy type inflatable life rafts for use throughout the fleet (ships and aircraft):

a. MK-6 Mod 3, 25 person, air inflated - currently carried by surface force ships/aircraft carriers, encapsulated in a fiberglass container.

b. MK-7 Mod 0, 25 person, air inflated - currently carried by surface force ships/aircraft carriers, encapsulated in a fiberglass container.

c. MK-8 Mod 0, 50 person, air inflated - currently carried by aircraft carriers, encapsulated in a fiberglass container.

d. LRU 13/A (former MK-2), 7 person, CO_2 inflated - used on aircraft, certified to Naval Air Systems Command (NAVAIR) requirements.

e. 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 or tagged on the outside of the life raft container or verified from the ship's life raft log inspection, recertification records, or unavailable by scanning and electronic remote identification, life raft certification will be considered expired.

c. Submit an OPNAV 4790/2K to the Fleet RMC for recertification.

18.4 CONTINGENCY POOLS. Designated Fleet Maintenance Activities in the Atlantic and Pacific Fleets are responsible for coordinating the disposition of assets and maintaining contingency pools within authorized limits. Contingency pools will consist of the MK-6, MK-7, MK-8 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. Contingency pools are authorized a limit not to exceed 100 rafts unless approved by the Fleet Life Raft Program Manager.

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 life raft contingency pool manager for disposition and turn-in instructions for all rafts that 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 Fleet Life Raft Repair Facilities and Contingency Pools:

Norfolk Ship Support Activity (NSSA) Norfolk Naval Shipyard, Portsmouth, VA
Southwest Regional Maintenance Center (SWRMC) - San Diego, CA
Naval 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, MK-7 and MK-8 life raft population (www.boats.dt.navy.mil). 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., Fleet Maintenance Activity, 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 RMC 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 RMC/RRC/Fleet Maintenance Activity 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 or canister joint in the horizontal position.

e. Upon notification of decommissioning from the TYCOM, contact the designated Life Raft Contingency Pool 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 Life Raft Repair Facility, using the ship's Operating Target (OPTAR) funds only when contingency pool assets can not support the replacement.

18.6.2 Regional Maintenance Center/Regional Repair Center.

a. RMC/RRC Designated Regional Maintenance Centers are responsible for establishing priority of work, scheduling, coordinating PMS recertification and any repair service to support fleet life rafts unless otherwise directed by the Fleet Life Raft Program Manager.

b. RMC/RRC/Designated Regional Maintenance Centers will function 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 Life Raft Regional Maintenance Center for action. Issue an immediate replacement from contingency pool assets, if available, and/or recertify within the defined schedule.

(c) If the Life Raft Regional Maintenance Center is temporarily overloaded and contingency assets cannot fulfill the requirements, screen the repair or recertification to a NAVSEA certified industrial activity.

(d) 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.

c. Inform the Fleet Life Raft Program Manager and cognizant TYCOM (N43) of any problems encountered.

18.6.3 Regional Maintenance Center.

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. Fleet Maintenance Activities 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. Job Sequence Numbers, 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.

VOLUME VI

CHAPTER 19

MAINTENANCE AND MATERIAL MANAGEMENT

REFERENCES.

(a) NAVSEAINST 4790.8/OPNAVINST 4790.4 - Ship's Maintenance and Material Management (3-M) Manual
(b) NAVEDTRA 43241 - Personnel Qualification Standard for Ship's Maintenance and Material Management (3-M) System

LISTING OF APPENDICES.

A 3-M System Assessment/Evaluation Procedures
B Format for Reporting 3-M Assessments
C Listing of Standard Work Center Codes
C_1 Standard Work Center Codes for Naval Air Force Ships
C_2 Standard Work Center Codes for Naval Expeditionary Combat Command
C_3 Standard Work Center Codes for Naval Submarine Force Ships
C_4 Standard Work Center Codes for Naval Surface Force Ships
D Listing of Standard Work Center Codes for Master Job Catalog Items Contained in Ship's CSMP (Surface and Submarine Forces only)
E Job Originator Values
F Sample Situational Requirement Reference Sheet

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. To maintain high levels of Operational Readiness by ensuring that Material Readiness, which is a key component of Operational Readiness, is supported throughout the chain of command with clear and concise directives, maintenance requirements and maintenance procedures.

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, activities under the cognizance of Commander Naval Expeditionary Combat Command, Commander Naval Reserve Force, and Naval Personnel Development Command.

a. 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 Strategic Systems Programs, 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 as applicable:

a. Afloat Maintenance Data System (MDS).

(1) Ship's Non-Tactical Automated Data Processing System (SNAP) I/II/III Organizational Maintenance Management System (OMMS).

(2) Optimized Ship's Non-Tactical Automated Data Processing System (Optimized SNAP) (R-Admin, R-Supply, Organizational Maintenance Management System – Next Generation (OMMS-NG)).

(3) Mission Readiness Assessment System.

b. Ashore Planned Maintenance System (PMS).

(1) Maintenance Figure of Merit.

(2) Navy Enterprise Resource Planning.

(3) Regional Maintenance Information System (RMAIS).

(4) Maintenance Resource Management System.

(5) TRIDENT Logistical Data System.

c. Planned Maintenance System Scheduling (SKED software).

d. Alteration Management System.

(1) Navy Data Enterprise.

(2) Type Commander Alteration Management System.

e. Current Ship's maintenance Project (CSMP).

f. (Submarines only) Technical Feedback Report History/Tracking (TFBR H/T) Program.

g. Master Job Catalog (MJC).

h. (Submarines only) Technical Feedback Report (TFBR) Screening.

i. Maintain an Assessment Data File in accordance with Appendix A.

19.2.1.2 Type Commander 3-M Regional Representatives (Submarines only). TYCOM 3-M Regional Representatives have been established at all submarine homeports. These Regional Representatives provide TYCOM continuous monitoring of 3-M requirements for assigned submarines and provide assistance to Submarine Force Activities and Squadron Commanders in the operation and administration of the 3-M Program. Their areas of responsibility include but are not limited to the following:

a. Act as team "lead" for all 3-M Assessments of activities under their cognizance and provide the results of the assessment to the ship or activity via the Immediate Superior In Command (ISIC) using the format of Appendix B.

b. Originate all correspondence relating to 3-M Assessments, Periodic Monitoring, and reports of non-compliance with CNO WASHINGTON DC/YMS: 941107/4790.4C and COMUSFLTFORCOMINST 4790.3.

c. Carry out the duties and responsibilities of the TYCOM during PMS installations.

d. Monitor MDS documents and report deficiencies to the ISIC for corrective action.

e. Provide the following support to the ISIC:

(1) 3-M System monitoring.

(2) TYCOM 3-M Assist Visits as described by reference (a).

(3) PMS MDS technical assistance.

(4) On site training in PMS, MDS and PMS Scheduling (SKED software).

(5) Assistance with the preparation and submission of TFBRs.

(6) Assistance in obtaining prompt correction to faulty PMS documentation (liaison with In-Service Engineering Activity (ISEA)).

(7) On a case basis, provide the authorization to use modified (red lined) PMS documentation.

19.2.1.3 Immediate Superior In Command. The ISIC shall designate a 3-M Officer in writing. The 3-M Officer is responsible for the satisfactory administration of 3-M programs, in accordance with reference (a) and this chapter, for subordinate Commands or activities.

19.2.1.4 In-Service Engineering Activity. ISEAs 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. Timely responses to TFBRs.

d. Providing copies of critical TFBR resolutions to all holders of the affected Maintenance Index Page (MIP)/Maintenance Requirement Card (MRC). All other resolutions will be integrated into the next available Force Revision.

19.2.1.5 Naval Sea Logistics Center Detachments. Responsibilities include but are not limited to the following:

a. Maintain the Navy PMS Database.

b. Receive, screen and process TFBRs.

c. Resolve TFBRs within their technical capability.

d. Develop and distribute Force Revisions as required.

19.2.1.6 Submarine Maintenance Engineering, Planning and Procurement Activity (Submarines only). Submarine Maintenance Engineering, Planning and Procurement Activity (SUBMEPP) is a NAVSEA engineering activity chartered to support NAVSEA and the submarine TYCOMs in their effort to maintain a high degree of Submarine Force Material and Operational Readiness. In support of 3-M, SUBMEPP is tasked by NAVSEA and the TYCOMs with the following:

a. Act as the TYCOM screening activity for TFBRs submitted by Submarine Force activities.

b. Maintain the Submarine Force TFBR H/T Program.

c. Establish, maintain, update and distribute all requirements as MJC Items in support of TYCOM Alteration Management System, Periodic Maintenance Requirements (PMR), Baseline Overhaul Work Packages/Selected Restricted Availability (SRA) Routines and Standard Availability Routines.

d. Provide semi-annual analysis of Naval Sea Logistics Center (NAVSEALOGCEN) historical MJC originated data and distribute updated planning and estimating data to include changes in estimated MJC manhours.

e. Provide semi-annual analysis of NAVSEALOGCEN historical PMR originated data and distribute updated manhour and material requirements to the PMR scheduling and Technical Repair Standards.

f. Liaison with ISEAs and NAVSEALOGCEN detachments to ensure submarine TFBRs receive accurate and timely responses.

g. Assist with PMS installation on all new construction submarines.

19.2.1.7 Afloat Training Group (Surface Force Ships only). Afloat Training Groups are under the technical administration of the Fleet Training Commands. They provide Surface Force platforms with the following:

a. Conduct 3-M Assessments.

b. Technical and personal support for 3-M training.

c. 3-M training services as needed.

19.2.1.8 Ship's Maintenance and Material Management Coordinator/Officer. The duties and responsibilities of the Ship's Maintenance and Material Management Coordinator (3-MC)/3-M Officer are well defined in reference (a). Specifically the 3-M Coordinator/3-M Officer is the functional manager of the 3-M System and is responsible to the Executive Officer for the administrative requirements 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 II-A 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 items outstanding for more than 30 calendar days are converted to 3-M deferrals.

d. Administer the Ship's configuration management program.

19.2.1.9 Command Maintenance Availability Coordinator/Ship's Material Maintenance Officer. The Command Maintenance Availability Coordinator/Ship's Material Maintenance Officer will be responsible for the coordination of all Fleet Maintenance Activity (FMA) repairs and coordinate closely with the 3-M Coordinator. The Command Maintenance Availability Coordinator/Ship's Material Maintenance Officer 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 and other MJC originated deferrals.

(3) (Submarine Force only) Ensure corrective maintenance described in Block 35 (Remarks) of the Ship's Maintenance Action Form OPNAV 4790/2K of reference (a) (2-Kilo) includes reference to the associated Maintenance Standard when applicable.

(4) Collect supplemental 2-LIMA 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. Ensure Command's preparations for an FMA availability are conducted in accordance with Volume II, Part I, Chapter 4 of this manual.

c. Meet daily, during an availability, with the assigned Ship Superintendent to discuss the status of all active jobs.

d. Attend all FMA production, night work, and management meetings.

e. Provide a daily FMA job status to each Department Head, Division Officer, and Leading Petty Officer.

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 of automated products in support of the 3-M system, as well as the various Maintenance Automated Information Systems, dictate that a standard force WC organization be maintained. Commanding Officers shall designate their Command organization and applicable WC codes as listed in Appendix C of this chapter. Additionally:

a. Commands shall 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. 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, tug, receiver, and service craft managers will use the specific WCs identified in Appendix C3 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. (Surface and Submarine Forces only) Standard MJC assigned WC codes are reflected in Appendix D of this chapter.

19.2.3.2 Job Control Number. The Job Control Number (JCN) is the key identifier for maintenance actions and related supply documents. The JCN is used to identify the maintenance action and to relate all of the parts used when a ship reports a maintenance action and it links all associated reporting of a maintenance action. The JCN is comprised of three blocks as defined by the Ship's 3-M manual. Block 1 is the Ship's Unit Identification Code (5 numeric characters), Block 2 is the WC (4 alphanumeric characters, left justified) and Block 3 is the Job Sequence Number (JSN) (usually 4 numeric characters).

19.2.3.3 Job Sequence Number. The first position of the JSN is used to identify the tool or organization that created the 2-Kilo. In the case of activities other then the ship creating jobs for the ship, this first character of the JSN will be an "ALPHA" character. The control over which organizations/tools "OWN" which "ALPHA" character(s) is provided by the Job Originator Values, Appendix E of this chapter, developed within the Maintenance and Modernization Business Unit and is available through the NAVSEALOGCEN website under Maintenance and Modernization Business Unit look up tables. The specific value contained within the first position of the JSN provides enhanced data mining capabilities and facilitates data aggregation and analysis.

19.2.3.4 Scheduling. PMS is a portion of the Command's 3-M program that provides, in one authoritative system, the scheduling information and technical procedures governing planned maintenance. PMS provides a simple method for scheduling, and documenting the execution of planned maintenance procedures. Fleet 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 in SKED against any Maintenance Requirement (MR) which is a "Safety of Ship" item. A "Safety of Ship Item" is defined as any maintenance action vital to the maintenance of a submarine's watertight integrity or its ability to return safely to the surface. "Safety of Ship" MRs, so designated by the cognizant technical authority, are annotated on the MIP with a single asterisk (*) in the periodicity code column. Commanding Officer notification is required for non-accomplishment of any "Safety of Ship" designated MR.

b. Situational reference sheets will be maintained/posted in the WC PMS Manual. 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 F of this chapter provides a typical situational reference sheet.

19.2.3.5 Accountability. The credibility of the Navy PMS program relies heavily on the individual accomplishing the maintenance. The required dedication and integrity of that individual cannot be overstressed. With shrinking budgets, Maintenance Effectiveness Reviews, Reliability Centered Maintenance and "fewer individuals to do more" the complete "step-by-step" performance of assigned maintenance is of paramount importance. To maintain accountability, personnel are required to sign for the completion of assigned maintenance in an Accountability Log. The Work Center Supervisor (WCS) is required to review and sign the Accountability Log weekly to verify the accuracy and completeness of entries. Accountability sheets will be maintained in the WC PMS Manual for a period of not less than 13 weeks.

19.2.4 Preventive Maintenance Feedback Reports. The PMS Feedback Report (FBR) is used to notify NAVSEALOGCEN Det Norfolk/San Diego of matters related to PMS, and the FBR may be screened by the TYCOM. Feedback forms are used to report problems and also to request PMS coverage for newly installed systems or equipments. While a request for PMS coverage will provide initial PMS coverage and changes, submission of an OPNAV 4790/CK form is required to initiate the rest of the logistic support change process in accordance with reference (a). All SKED users shall submit FBRs via SKED. Non-SKED users may submit FBRs via the Planned Maintenance System Management Information System (PMSMIS) website at https://algol.seajax.navy.mil/pmsmis by selecting the Feedback tab and Feedback Wizard. Non-SKED users accessing this website for the first time will need to request an account. Click on File Manager and select New User Account Request. This displays options to select a form and readme file, which can be downloaded, filled out and sent via e-mail as directed in the readme file. An e-mail will be sent to you confirming your account and providing access to the main screen.

19.2.4.1 Technical Feedback Report Reporting (Submarine Force only). The PMS FBR is used to notify the NAVSEALOGCEN Det Norfolk/San Diego of matters related to PMS, and is screened by the TYCOM. Feedback forms are used to report problems and also to request PMS coverage for newly installed systems or equipments. While a request for PMS coverage will provide initial PMS coverage and changes, submission of an OPNAV 4790/CK form is required to initiate the rest of the logistic support change process in accordance with reference (a). The TFBR Process Map is shown in Volume V, Part I, Chapter 5, Figure 5-18 of this manual. Submarines transmit TFBRs to their parent 3M Representative on navy.smil.mil via SIPERNET (3M Coordinators should be aware of the default SEAJAX email address that is programmed into SKED. They should ensure that TFBRs are emailed via SIPERNET to the parent 3M Representative in their homeport).

19.2.4.2 Technical Feedback Report History Tracking Program (Submarine Force only). The TFBR H/T Program is a database that contains summary information taken from TFBRs initiated by COMSUBLANT/COMSUBPAC units and support activities. The program is available via the World Wide Web with the data updated weekly. Each TFBR is presented with a header identifying the feedback report serial number, a summary of the action request and the resolution. The TFBR H/T Program contains copies of the original TFBRs and supporting documents.

a. The system provides a centrally controlled, comprehensive TFBR/MIP/MRC history, intended to improve response time, problem resolution and reduce redundant TFBRs.

b. The program is available to TYCOMs, Submarine Squadrons, Submarine Support Activities, ISEAs and others involved in resolving TFBRs.

19.2.4.3 Type Commander Screening of Technical Feedback Reports (Submarine Force only). SUBMEPP has been designated by Commander Submarine Force as the TYCOM screening activity for all Submarine Force Activities. TFBRs are accessed by SUBMEPP via the PMS Management Information System prior to delivery to the NAVSEALOGCEN. SUBMEPP reviews the proposed TFBR and will:

a. Return the TFBR to the originator under any one or all of the following circumstances:

(1) An answer currently recorded in the TFBR H/T Program satisfies the proposed TFBR. The TFBR will be returned with authorization to implement the previously received response or rationale for non-concurrence.

(2) A similar request has already been submitted and submission of another duplicative request will add no value to the process.

(3) The TFBR requests actions contrary to the direction of this manual or reference (a).

(4) The request does not adequately address or identify the problem. In cases of this nature, return of the TFBR to the originator will be a last resort, as SUBMEPP will attempt to contact the originator to better define the issue.

b. Forward the TFBR for further processing taking any one or a combination of the following actions:

(1) Provide amplifying information.

(2) Correct erroneous data.

(3) Provide TYCOM concurrence of the requested change.

(4) Provide a Do Not Concur recommendation to NAVSEALOGCEN/ISEA.

19.2.5 Submarine Safety/Scope of Certification/Survivability and Escape (Submarine Force only).

a. MRCs which direct work/entry within the Submarine Safety (SUBSAFE) Certification Boundary, require Re-Entry Controls to be invoked. In order to ensure that these controls are initiated, Ship's Force personnel shall over stamp those MRCs requiring such work/entry with the word "SUBSAFE" in red ink. New PMS MRC editing programs are being developed where watermarking of MRCs will begin to show up on published PMS MRCs. If a "SUBSAFE" MRC has a "SUBSAFE" watermark, over stamping in red ink as described above is not required.

b. MRCs which direct work/entry within the Scope of Certification (SOC) Certification Boundary, also require Re-Entry controls to be invoked. SOC documentation is applicable and governing to Dry Deck Shelter (DDS)/Advanced SEAL Delivery System (ASDS) host platforms and must be loaded to Work Center WK02 for those platforms. SOC MRCs are annotated on the MIP with either an "X" or an "R" in the "OTHER" column. Non-DDS/ASDS platforms need not establish WK02 nor are they governed by SOC directives.

c. Survivability and Escape Equipment and supporting maintenance has come under increased scrutiny since the loss of the Russian submarine KURSK. All MIPs and associated MRCs dealing with Survivability and Escape equipment are to be loaded to Work Centers (WC) in accordance with Table 19-1.

Table 19-1

MIP	SYSTEM	REQUIRED WC
5940/905	SCV and HIS Valves	EA01
5940/006	ExtendAir	EA01
5940/005	SEIE and Crash Bags	WK01 (WF01 for SSN 774 Class)
5940/004	Helicopter Transfer Kit	WK01 (WQ01 for SSN 774 Class)
5940/003	MROD	RL01 (SSBN/GN 726 Class and 21 Class only)
5940/002	SUB MKIIP (ANALOX)	NE01
5940/001	LiOH Curtain	EA01
4413/015	SEPIRB	OC01

19.2.6 Evaluation.

19.2.6.1 Assessments.

a. Goal/Intent. To ensure that the Command's 3-M program is functioning at maximum efficiency and per the requirements of reference (a) and this chapter. The CNO Maintenance Availability should be counted when determining when these inspections are to be done. Evaluations shall be conducted on a not to exceed normal Fleet Response Plan cycle or more frequently when deemed necessary by either the TYCOM, ISIC (Command exercising administrative control) or the unit's Commanding Officer. 3-M assessments for each unit can be scheduled without advanced notice and shall be conducted in accordance with the criteria and format established in Appendix A of this chapter. The TYCOM shall ensure that each activity shall evaluate all departments performing PMS at least once every Fleet Response Plan cycle.

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. TYCOMs may authorize the utilization of specific check sheets to reflect current directives and system operation modernization provided that attributes provided by Appendix A of this chapter are properly evaluated when applicable.

(1) 3-M Assessment Command Total Score - (Percentage).

(2) 3-M Assessment - Above Standards (90% or greater)/At Standards (80-89.99%)/Below Standards (less than 80%).

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 B 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 TYCOM via the ISIC within 30 days following the assessment.

b. Any department receiving an overall evaluation of below standard in either PMS or MDS shall be re-evaluated within a reasonable period of time, not to exceed six months, to ensure below standard areas have been corrected.

c. Annually, the United States Fleet Forces Command (USFFC N43) will convene a conference with Commander, Pacific Fleet and all TYCOMs to review the previous year's 3-M Assessment trends, concerns and future direction.

APPENDIX A

3-M SYSTEM ASSESSMENT/EVALUATION PROCEDURES

1. The purpose of this Appendix is to provide a standard means for evaluating the 3-M programs aboard ship and shore commands. These procedures are used to conduct 3-M Assessments.

2. The ISIC shall conduct a complete assessment of each command under their cognizance, not to exceed 24 months. If a command is going to exceed the 24 month periodicity, the ISIC shall submit a message request for extension to the Type Commander. The Type Commander, when replying to the request for extension, shall include Commander, United States Fleet Forces Command (CUSFFC) N43 or Commander Pacific Fleet N43 (as applicable) as an information addressee. Only the Type Commander can authorize such an extension.

3. 3-M Assessments may be conducted without advanced notice. Time spent in major CNO Maintenance Availabilities should be counted in determining when these inspections are to be done. However, the availability of maintenance data subject to review shall be considered prior to scheduling the assessment. An assessment data file will be maintained for each unit in a Type Commander's tracking database. As each command is evaluated, the individual evaluation standard identified in paragraphs below and calculated values will be recorded in the data base and a copy of the assessment report will be provided to the command. Sections I through VI of this Appendix provide the specific criteria to be used in the assessment of each command.

4. The 3-M assessment procedures are divided into six major areas:

   a. Section I - Assessment of Administration Effectiveness Review (AER).

   b. Section II - Assessment of Accomplishment Confidence Factor (ACF) (Spot Checks).

   c. Section III - Assessment of CSMP Validity Factor (CVF).

   d. Section IV - Assessment of Recorded Accomplishment Rate (RAR) or PMS Accomplishment Rate (PAR).

   e. Section V - Executive Effectiveness Review (EER).

   f. Section VI - 3-M Assessment Command Total Score.

5. The following evaluation criteria will be used:

   a. Commands/Departments will be evaluated as "Above Standards" overall in 3-M if the ship's total score is 90% or higher.

   b. Commands/Departments will be evaluated as "At Standards" overall in 3-M if the ship's total score is between 80% and 89.99%.

   c. Commands/Departments will be evaluated as "Below Standards" overall in 3-M if the ship's total score is less than 80%.

6. All calculations shall be rounded to two decimal places.

7. All calculations of the individual Work Center's contribution to a Department's and Command's total score is weighted based on the amount of PMS scheduled. This is to ensure the grades assigned are commensurate with the level of effort required between Work Centers. This weighting of scores is automatically calculated by inputting PMS actions derived from SKED into the individual Work Center's Performance Evaluation Database.

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APPENDIX A

SECTION I

ASSESSMENT OF ADMINISTRATION EFFECTIVENESS REVIEW (AER)

1. Complete the administrative review checklist for each Work Center per Section I-A of this Appendix. Enter a numeric evaluation of each assessment attribute and provide amplifying information to describe the deficiencies driving point deductions on the "Remarks" page provided. Significant deficiencies shall be reported via the final assessment report.

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APPENDIX A

SECTION I-A

ADMINISTRATION EFFECTIVENESS REVIEW (AER)

Ship	Department	Division	Work Center	Date

General

		Assessment Attribute	Value	Grade
1.	Does the Work Center PMS file contain:			
	a.	A correction sheet that indicates all changes? (e.g., FR, ACN, TFBR response)	1	
	b.	Supplementary information (e.g., current and applicable 3-M messages and notices)?	1	
	c.	Current List of Effective Pages (LOEP)? (Verify Force Revision number.)	1	
	d.	All Maintenance Index Pages (MIPs) current? (Verify MIP control numbers against the LOEP and against SKED.)	1	
	e.	Current Service Brief? (Electronic or printed.)	1	
2.		Are all pen and ink changes on the LOEP and MIPs (except where allowed by management aids) annotated with the reference for the change (TFBR serial, Document Input Transmittal serial, etc.) and properly noted by the correct authority?	5	
3.		Are any applicable MRCs incorrectly lined out or not lined out on MIPs? Do all related maintenance and safety of ship references match the MIPs? (Was all maintenance scheduled correctly?)	10	
4.		Does the Work Center retain an auditable record of personnel PMS qualifications and designation letters?	3	
5.		Does the Work Center retain an auditable record of personnel qualified to perform maintenance within controlled work boundaries (QA PQS 301 Craftsman)?	3	
		Maintenance Requirement Card (MRC) Deck		
6.		Is the work center deck of MRCs, including classified MRC locator cards, complete and current (verify syscom MRC control number against MIPs) per the 3-M Manual/TYCOM Guidance?	2	
7.		Are classified MRCs complete and current?	5	
8.		Are blanks requiring Ship's Force data filled in prior to use?	3	
		Equipment Guide Lists (EGL)		
9.		Are EGLs entered in SKED for all applicable equipment?	5	
10.		Are EGLs current and a paper copy attached to the parent MRC, if printed? (verify MRC control number against MRC).	3	
11.		Are EGLs properly filled out (e.g., equipment name, equipment location, equipment unique identifier)?	2	
12.		Are separate EGLs prepared for items that require more than one days worth of work?	1	
		Situational Requirements		
13.		Do the situational requirements listing reflect the most current force revision? (List is available on PMS CD under R-Check header.)	2	
14.		Do the situational requirements listing reflect the current status of the Work Center MIPs? (Line outs on MIP transferred to the situational requirements listing.) Are lineouts initialed by the WCS?	3	

Assessment Attribute			Value	Grade
Situational Requirements (Cont'd)				
15.		Does the R-Check event manager reflect situational maintenance properly entered?	3	
16.		Are situational events being triggered in SKED when applicable?	5	
PMS Execution & Accountability				
17.		Have completed log sheets been reviewed by the Work Center Supervisor and Division Officer?	3	
18.		Was maintenance assigned only to qualified maintenance personnel for MRCs requiring unique qualifications/NECs?	5	
19.		Is all applicable information entered (e.g., maintenance person assigned, maintenance person signature, date completed)?	2	
20.		Are 13 week accountability logs retained for the current week and 13 previous weeks?	3	
21.		Is the responsible maintenance person listed on the logs signing for completion of the maintenance action?	2	
22.		If multiple maintenance persons are assigned, is the petty officer in charge or the most senior person signing for completion of the maintenance action?	2	
23.		Was the maintenance (e.g., currently scheduled, previously completed, situational requirements and unscheduled maintenance added) on the accountability logs entered into SKED?	10	
24.		Is a flip page entry made for items not completed during the week?	2	
25.		Were deferred MRCs within periodicity placed into the Reschedule column and carried over into the next quarter?	5	
26.		Is a unique SOMS identifier/tagout serial number or N/A entered in the tagout block?	2	
27.		Is any means being used to identify mandatory related maintenance items with their parent PMs on the accountability logs to ensure that the maintenance person completes all related maintenance items at the same time?	5	
Feedback Report File (N/A for Commands utilizing SKED to manage)				
28.		Does the Work Center retain one year of feedback accountability logs?	2	
29.		Does the Work Center retain copies of outstanding (unresolved) Work Center FBRs?	3	
Inactive Equipment Maintenance (IEM)				
30.		Is the start of IEM correctly annotated (including IEM status II having a valid reason entered)?	2	
31.		Are all IEM requirements properly scheduled (e.g., LU, PM, SU, OT)?	5	
32.		Is the completion of the inactive period correctly annotated?	2	
End of quarter reports (if applicable)				
33.		Does the end of quarter reports (4 quarters) contain:		
	a.	The PMS Performance Report.	2	
	b.	The Flip Page Report.	2	
	c.	The Quarterly (Submarine Force only).	2	

Assessment Attribute			Value	Grade
End of quarter reports (if applicable) (Cont'd)				
34.		Are end of quarter reports reviewed, signed and dated by the COC (indicating awareness of incomplete or unaccomplished maintenance requirements)? Are previous periods archived in SKED following close-out by Dept Head and 3MC?	5	
Totals (**Attributes evaluated as N/A are not calculated**)		Total Points Available	Total Points Awarded	
Administrative Effectiveness Review (AER) (Grade = Points Awarded/Points Available)				
☐ Above Standards ☐ At Standards ☐ Below Standards				

Above Standards (90% or greater)/At Standards (80-89.99%)/Below Standards (less than 80%)

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ADMINISTRATION EFFECTIVENESS REVIEW (AER) REMARKS

Provide the attribute number and amplifying information describing the deficiency that has caused a deduction of points.

Attribute No.	Amplifying Information

_____ _____

Print and Sign Inspector Name/Command Date

APPENDIX A

SECTION II

ASSESSMENT OF ACCOMPLISHMENT CONFIDENCE FACTOR (ACF)

1. Using the basic definitions and guidelines described, determine the PMS Accomplishment Confidence Factor (ACF) for each Work Center. Enter the values determined on the Spot Check Monitor Form, Section II-A of this Appendix.

a. Using SKED, randomly select MRCs that have been recently recorded as accomplished (within the past 13 weeks) until at least 2% of the total number of MRCs scheduled have been selected.

b. Complete an MRC Evaluation/Spot Check Sheet, Section II-A of this Appendix, for each MRC selected. Based on the results, evaluate the overall effectiveness of the accomplishment of each MR selected. Enter a numeric evaluation of each assessment attribute and provide amplifying information to describe the deficiencies driving point deductions. Significant deficiencies shall be reported via the final assessment report.

2. The Accomplishment Confidence Factor (Spot Check) Check Sheet is a series of inspection attributes to determine the accomplishment status of an MRC that had previously been reported as accomplished. Although the sheet may be used as a reference for conducting a real time monitored MRC as described by reference (a), paragraph 2-8.b., for the purposes of conducting a 3M Inspection or Self Assessment to determine ACF, all spot checks will be conducted on accomplished (historic) MRCs.

NOTE: DUE TO THE NATURE OF MRC COMPLETION, SUPPORTING PROGRAMS SUCH AS TAG OUTS AND HAZARDOUS MATERIAL (HAZMAT) ARE ENCOUNTERED. CARE SHOULD BE TAKEN TO AVOID EXPANDING THE SPOT CHECK TO A REVIEW OF THE PROCESSES OF THOSE PROGRAMS THEREBY PREVENTING THE ASSESSOR FROM DETERMINING THE ACCOMPLISHMENT STATUS OF THE MRC.

3. The following is expanded guidance for completion of the assessment attributes of the Spot Check sheet. Best practices or other policies not supported by source documentation shall not be included in evaluating compliance:

a. (1.a) Determine if the maintenance person is qualified to perform the maintenance task. PQS 301 is required for all MRCs but attention should also be paid to other qualifications required such as Quality Maintenance (see Volume 5, Part I, Chapter 3, paragraph 3.4 of this manual) or graduation from a required school such as gage calibration technician.

b. (1.b) Determine if the correct Tools, Material, Parts and Test Equipment (TMPTE) were used during the performance of the MRC when accomplished. If the maintenance person did not have the required TMPTE, it is unlikely that he/she would have been able to complete all the procedural steps of the MRC as required. If an item of TMPTE was required to perform a conditional step and that step was not required to be accomplished, it is not considered deficient. If the required test equipment required calibration, ensure that the calibration is within date and of sufficient scale to accomplish the MRC.

c. (1.c) Determine if the maintenance person maintained the correct equipment.

d. (1.d) Examine the MRC to determine that any locally applied changes are authorized by procedural notes, external correspondence, or allowed by reference (a).

e. (1.e) Determine applicability of the MRC to the component that the maintenance person signed for completion.

f. (2.a) From a variety of potential techniques, determine if the maintenance person performed all the required steps of the MRC. This may be accomplished via re-enactment, a discussion regarding the steps or re-performance. The inspector should come away with a clear impression that all the steps of the MRC were fully accomplished or not.

NOTE: IF A PROCEDURAL STEP WAS NOT COMPLETED, THE MRC SHOULD NOT HAVE BEEN REPORTED AS COMPLETE AND THEREFORE THE ATTRIBUTE GRADE SHOULD BE ZERO AND ALL SUBSEQUENT ATTRIBUTES SHOULD ALSO BE ZERO, THEREBY EFFECTIVELY "FAILING" THE SPOT CHECK.

g. (2.b) If required by the MRC, verify that a tag out was hung on the day the maintenance was performed. Ensure the isolation boundaries were appropriately identified and correctly positioned to ensure complete isolation of the maintained equipment. If no Tag Out was required, write NA on the sheet.

NOTE: IF A REQUIRED TAG OUT WAS NOT CONDUCTED IN SUPPORT OF ACCOMPLISHING THE MRC, THE MRC SHOULD NOT HAVE BEEN CONDUCTED AND REPRESENTS A SERIOUS SAFETY VIOLATION AND THEREFORE THE ATTRIBUTE GRADE SHOULD BE ZERO AND ALL SUBSEQUENT ATTRIBUTES SHOULD ALSO BE ZERO, THEREBY EFFECTIVELY "FAILING" THE SPOT CHECK.

h. (2.c) Determine compliance with all specific safety precautions listed on the MRC. If no safety requirements were invoked, write NA on the sheet.

NOTE: FAILURE TO ADHERE TO A SAFETY PRECAUTION PROVIDED ON THE MRC CONSTITUTES A SERIOUS SAFETY VIOLATION AND THE FAILURE TO PERFORM THE MRC AS WRITTEN. THE ATTRIBUTE GRADE SHOULD BE ZERO AND ALL SUBSEQUENT ATTRIBUTES SHOULD ALSO BE ZERO, THEREBY EFFECTIVELY "FAILING" THE SPOT CHECK.

i. (2.d) From the Equipment Guide List (EGL) or TYCOM approved list of equipment represented by the accomplished MRC, determine if the MRC was accomplished on each piece of equipment reported. If the MRC did not have an associated EGL or TYCOM approved listing, write NA on the sheet.

NOTE: A REPORT OF COMPLETION FOR A GROUP OF EQUIPMENT LISTED ON AN EGL OR TYCOM APPROVED LISTING REPRESENTS THAT ALL LISTED EQUIPMENT WAS MAINTAINED. IF THE ENTIRE LIST OF EQUIPMENT WAS NOT MAINTAINED, THE MRC SHOULD NOT HAVE BEEN MARKED AS COMPLETE AND THEREFORE THE ATTRIBUTE GRADE SHOULD BE ZERO AND ALL SUBSEQUENT ATTRIBUTES SHOULD ALSO BE ZERO, THEREBY EFFECTIVELY "FAILING" THE SPOT CHECK.

j. (3.a) By physical examination of the maintained equipment, determine if maintenance of the nature required by the MRC had been performed. Take note of fasteners that would have had to be disturbed, dirt in filters, fresh oil, etc. to make a judgment as to whether or not the maintenance has been performed. If unable to make this determination with absolute certainty, write NA on the sheet.

k. (3.b) Determine through questioning and record verification that HAZMAT was properly used and disposed of as a means of determining whether or not the MRC was accomplished. Once the inspector has determined that the HAZMAT was used and disposed of correctly, this attribute is considered fulfilled. If no HAZMAT was required to be utilized, write NA on the sheet.

NOTE DUE TO THE POTENTIAL LIABILITY INCURRED BY IMPROPER USE AND DISPOSAL OF HAZMAT, SOME WORK CENTERS HAVE ASSIGNED SPECIALLY TRAINED PERSONNEL THAT PROVIDE HAZMAT AND DISPOSE OF SURPLUS MATERIAL INSTEAD OF THE MAINTENANCE PERSON. THIS IS ACCEPTABLE PROVIDED THE INSPECTOR CAN DETERMINE FULL COMPLIANCE.

l. (3.c) Determine if the maintenance person could have performed the MRC from a standpoint of being trained and proficient in the tasks called out for by the procedure.

m. (4.a) Determine if the maintenance person filled out the 13 Week Accountability sheet correctly for the accomplished MRC. Ensure that if a tag out isolation was used, the tag serial number is recorded in the space allowed. Ensure that the printed name and legal signature of the maintenance person who actually performed the maintenance is recorded or, in case of group performed PMS, the Petty Officer in charge of the group.

n. (4.b) From reviewing the discussions and findings during the course of the spot check, determine if a TFBR had been submitted if required. If no TFBR was required, write NA on the sheet.

o. (4.c) Determine if a material deficiency was noted during the PMS; if so, examine the CSMP to ensure the deficiency was documented. If no material deficiency was noted, write NA on the sheet.

4. Due to the potential issues that are raised when a spot check is determined to be below standards, care should be taken to clearly identify contributing deficiencies that led to the conclusion that the MRC was not conducted as written or not conducted at all so that the command undergoing inspection can properly conduct root cause analysis for formulating effective correction action.

APPENDIX A

SECTION II-A

ACCOMPLISHMENT CONFIDENCE FACTOR (SPOT CHECKS) CHECK SHEET - ACF

Ship USS	Department	Division/Equipment	Work Center	Date Performed	MRC Evaluated	MIP Evaluated

General
***If attributes 1.a or 2 are evaluated as unsatisfactory, all subsequent attributes shall be graded as "0".**

		Assessment Attribute	Value	Grade	Notes
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.**				
*	a.	Is the maintenance person PQS qualified to perform the MR?	2		
	b.	Presented the correct tools, Personal Protective Equipment (PPE) parts (NSN), material (Military Specification (MILSPEC)) and test equipment (Calibrated).	3		
	c.	Properly identified the equipment (location, equipment validation).	4		
	d.	Are there any unauthorized changes or corrections to the MRC?	3		
	e.	Is this the correct MRC for the equipment maintained?	3		
2.*	**Demonstrated all steps of MR including all notes, warnings and cautions according to the MRC.**				
*	a.	Followed all steps of the MRC.	5		
*	b.	Correctly performed equipment Tagout.	5		
*	c.	Followed all safety precautions.	5		
*	d.	If an EGL is used, was the MRC performed on all equipments?	5		
3.	**Does the equipment condition reflect accomplishment of the MRC?**				
	a.	Is it apparent that maintenance was performed recently?	10		
	b.	Correctly demonstrated use and disposal of Hazardous Material.	3		
	c.	Was the MRC within the capability of the assigned individual to perform as written?	5		
4.	**PMS Reporting**				
	a.	Maintenance person reports status of MR to the WCS if Completed or Not Fully Accomplished and makes appropriate updates.	2		
	b.	Work Center generates TFBR for any problem with MRC.	2		
	c.	Were material deficiencies detected by the PMS action and recorded in MDS?	2		

Totals (Attributes evaluated as N/A are not calculated.)	Total Points Available	Total Points Awarded
Spot Check (ACF) (Grade = Points Awarded/Points Available)		
☐ Above Standards ☐ At Standards ☐ Below Standards		

Above Standards (90% or greater)/At Standards (80-89.99%)/Below Standards (less than 80%)
Below Standard grade requires immediate accomplishment monitored by a Chief.

Additional Remarks:

_____ _____

Print and Sign Inspector Name/Command Date

APPENDIX A

SECTION III

ASSESSMENT OF CURRENT SHIP'S MAINTENANCE PROJECT VALIDITY FACTOR (CVF)

1. Using the basic definitions and guidelines described, determine the CSMP Validity Factor (CVF) for each Work Center. Enter the values determined on the CSMP Monitor Form, Section III-A of this Appendix.

2. The CVF worksheet shall be utilized for evaluating each work candidate selected. The results of the CVF work sheet are transferred to the CVF Checklist for incorporation with other attributes evaluated.

NOTE: SEVERAL ATTRIBUTES CONTAINED ON THE CSMP VALIDITY CHECKLIST ARE NOT INCORPORATED INTO THE GRADE AND ARE DESIGNED TO CAPTURE CSMP DATA FOR FURTHER ANALYSIS.

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APPENDIX A

SECTION III-A

CURRENT SHIP'S MAINTENANCE PROJECT VALIDITY FACTOR (CVF) CHECKLIST

Ship	Department	Division	Work Center	Date

General		
	Assessment Attribute	**Value**
	CSMP VALIDITY (Raw Data)	
1.	Number of TA-1 Work Candidates	
2.	Number of TA-2 Work Candidates	
3.	Number of TA-3 Work Candidates	
4.	Number of TA-4 Work Candidates	
5.	**Total Work Candidates (WC)** Sum of 1-4	
6.	Number of TA-2WC over 180 days old	
7.	Number of TA-4WC over 180 days old	
8.	**Aged Work Candidates (WCO)** Sum of 6-7	
9.	**Material Correction Rate: WCO/3 (Aged TA-4)** (#7/3)/#4	
10.	CSMP Validity review results from CVF Sheet Enter score from CVF Worksheet	
11.	Ship's Force WC over 7 days old that require parts and the parts are not ordered.	
12.	Open Ship's Force WC over 30 days old, not uplined to the Master CSMP.	
13.	Total Work Candidate Deficiencies (WDC) Sum (#11-#12)/#4	
14.	Work Candidate Multiple Average #9, #10, and #13	
15.	Material deficiencies noted by MRC spot checks that were not documented in the CSMP	
16.	Deductions#15/#5	
17.	CSMP Validity Average #14 and #16	
CSMP Validity		
☐ Above Standards ☐ At Standards ☐ Below Standards		

Above Standards (90% or greater)/At Standards (80-89.99%)/Below Standards (less than 80%)

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APPENDIX A

SECTION III-A-1

CURRENT SHIP'S MAINTENANCE PROJECT VALIDITY FACTOR (CVF)

WORK CANDIDATE WORKSHEET

Ship	Department	Division	Work Center	Date

General

JCN	Equipment	1	2	3	4	5	6	7	8	9	10	CVF
CVF	Average all Cells	Ave	Ave	Ave	Ave	Ave	Ave	Ave	Ave	Ave	Ave	Ave

CSMP entry was reviewed with the following results:		Deduction
1.	Problem Description inadequate.	10
2.	Recommended Solution inadequate.	10
3.	Write up does not reflect maintenance level assigned.	10
4.	1st and 2nd Contact Man not assigned.	10
5.	Incorrect CSMP Summary.	10
6.	Correct Type of Availability (Maintenance Assignment) 1, 2, 3 Work Candidates.	10
7.	Priority Code incorrect.	10
8.	Write up does not match the Configuration Item or is not written on the correct configuration item.	10
9.	Does the Work Candidate reflect the current and correct status of the material deficiency?	10
10.	Was the correct special purpose and/or safety block selected with the correct values assigned? And if selected were the required Block 35 remarks present?	10
For attributes not required due to Class/Type differences N/A and recalculate total value of each field.		

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APPENDIX A

SECTION IV

ASSESSMENT OF RECORDED ACCOMPLISHMENT RATE (RAR) OR PMS ACCOMPLISHMENT RATE (PAR)

1. The RAR (SKED 3.1) or PAR (SKED 3.2 and higher) is a report automatically generated by SKED.

NOTE: SKED WILL NOT CALCULATE RAR DATA FOR A QUARTER THAT IS ARCHIVED UNLESS THAT QUARTER IS OPENED AND A PMS PERFORMANCE REPORT IS RUN ON THAT WORK CENTER.

2. (SKED 3.1) The RAR (Equipment Based) shall be utilized for entry in the Ship totals portion of the Performance Evaluation Database by utilizing a date range consisting of the previous 13 weeks of maintenance.

3. (SKED 3.2 or higher) The Periodic PAR grade shall be averaged with the Situational PAR grade and utilized for entry in the Ship totals portion of the Performance Evaluation Database by utilizing a date range consisting of the previous 13 weeks of maintenance.

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APPENDIX A

SECTION V

EXECUTIVE EFFECTIVENESS REVIEW (EER)

1. Using the basic definitions and guidelines described, determine the Executive Effectiveness Review (EER) for the ship. Enter the values determined on the EER Check list Form, Section V-A of this Appendix. Provide amplifying information for deficiencies causing point reduction on the remarks page.
2. Select ten percent (Surface and Submarine Forces) or two percent (Air Forces) of the crew who have access to MDS functions using the Section V-A-1 worksheet of Appendix A.
3. Select ten percent (Surface and Submarine Forces) or two percent (Air Forces) of the crew who have access to SKED functions using the Section V-A-2 worksheet of Appendix A.

NOTE: FOR LARGE SHIPS THAT EMPLOY DEPARTMENTAL 3-M OFFICES, THE EER FORM IS REQUIRED TO BE COMPLETED AND AVERAGED TO DETERMINE THE SHIP'S EER.

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APPENDIX A

SECTION V-A

EXECUTIVE EFFECTIVENESS REVIEW (EER) CHECKLIST

USS	Ship	Date

General

		Assessment Attributes	**Value**	**Grade**
1.	Does the 3-M Coordinator maintain?			
	a.	Record of MIP changes (ALID-1)?	1	
	b.	MIP to WC File (PMS-4)?	1	
	c.	Master LOEP (PMS-5)?	3	
	d.	Change Accountability Log (including TFBR Accountability Log)?	2	
	e.	Does the 3-MC maintain a log tracking the assignments of MRCs from a split MIP to ensure all applicable MRCs are assigned?	3	
	f.	Ship generated FBR response status in SKED and follow up action tracked?	3	
	g.	Master Confidential PMS card File?	2	
	h.	Current PMS CD-ROM?	1	
	i.	Current PMR Inventory and Schedules CD-ROM?	1	
2.		Does the 3-M Coordinator have an effective system for routing, explaining, and tracking of externally provided PMS documentation changes?	3	
3.		Is an effective system in use whereby supervisory personnel periodically and routinely monitor PMS performance in accordance with the requirements of reference (a) and this instruction?	5	
4.		Is the 3-M Functional Area Supervisor (FAS) ensuring all 3-M databases are being routinely maintained? (Use RAF computation sheet.)	10	
5.		Have all feedback reports entered in SKED been properly reviewed by the chain of command and submitted off hull within 7 days?	3	
6.		Have CSMP reconciliations been conducted per JFMM & TYCOM instructions?	3	
7.		Does the 3-MC conduct internal audits of all Work Center PMS Work Centers? (Retain latest copies of deficiencies noted and corrections for one year.)	5	
8.		Does the 3-MC provide weekly status reports to the 3-M Manager concerning the commands spot check/self evaluation program? (Retain for 1 year.)	3	
9.		Does the 3-MC have an approved master copy of PMS PQS specifically tailored for the command?	3	
10.		Does the 3MC maintain an auditable record of PMS and Quality Maintenance PQS? Are 3M qualifications commensurate to meet mission requirements?	5	
11.		Does the 3MC maintain an auditable record of PMS PQS for the command (e.g., copy of service record entries, signed copy of PQS cover letter, officer verified divisional training record)?	2	
12.		Does the 3MC track assessment MRCs (K for submarines/800 series for others) and verify completion with the local agency? Does the completion rate, when compared to the current monitoring period, reflect a successful shipboard program?	10	
13.		Does the 3MC ensure that a reliable system for backing up the ship's historical PMS data (SKED archives) is in place?	5	

Totals (**Attributes evaluated as N/A are not calculated**)	Total Points Available	Total Points Awarded
Executive Effectiveness Review (EER) (Points Available/Points Awarded)		
☐ Above Standards ☐ At Standards ☐ Below Standards		

Above Standards (90% or greater)/At Standards (80-89.99%)/Below Standards (less than 80%)

EXECUTIVE EFFECTIVENESS REVIEW (EER) REMARKS

Provide the attribute number and amplifying information describing the deficiency that has caused a deduction of points.

Attribute No.	**Amplifying Information**

_____ _____

Print and Sign Inspector Name/Command Date

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APPENDIX A

SECTION V-A-1

EXECUTIVE EFFECTIVENESS REVIEW MAINTENANCE DATA SYSTEM PROFICIENCY FACTOR (MPF) WORKSHEET

Ship	Department	Division	Work Center	Date

Individual Evaluated	**3-M Billet Assigned**

Proficiency Required						**Proficiency Attribute**	**Yes/No**
	MP	RPPO	WCS	DO	DH		
1	X	X	X	X	X	3-M PQS Qualification completed	
2	X	X	X	X	X	Able to Log-on. (OMMS-NG)	
CSMP ACTIONS:							
3	X	X	X	X		Add Maintenance Action (2-Kilo)	
4	X	X	X	X		Close Maintenance Action (2-Kilo)	
5	X	X	X	X		Change Maintenance Action (2-Kilo)	
6	X	X	X	X	X	Display Maintenance Action (2-Kilo)	
CONFIGURATION MAINTENANCE ACTION:							
7	X	X	X			Report installation of equipment: (CK)	
8	X	X	X			Report modification of equipment: (CK)	
9	X	X	X			Report removal of equipment: (CK)	
UPDATE SEF:							
10	X	X	X	X	X	Review on-line equipment records:	
11			X			Add equipment records:	
12			X			Modify equipment records:	
13			X			Delete equipment records:	
UPDATE LOGISTICS SUPPORT DATA (LSD) FILE:							
14	X	X	X	X	X	Review on-line LSD records:	
15			X			Add LSD data elements:	

Ship	Department	Division	Work Center	Date

Individual Evaluated	**3-M Billet Assigned**

Proficiency Required						**Proficiency Attribute**	**Yes/No**
UPDATE LOGISTICS SUPPORT DATA (LSD) FILE: (Con't)							
16			X			Change LSD data elements:	
17			X			Delete LSD data elements:	
SUPPLY REQUISITIONING:							
18		X	X			Order maintenance parts:	
19		X	X			Order non-maintenance related items:	
PRINT REPORTS:							
20		X	X			SEF summary reports:	
21		X	X	X	X	CSMP reports:	
PRE-TRANSMITTAL REVIEW:							
22			X	X	X	Review CSMP transactions:	
23			X	X	X	Review SEF transactions:	
24			X	X	X	Review FCFBR transactions:	

Totals						
11	**15**	**24**	**12**	**9**	Divide Total Yes by Proficiency Required totals for the billet held by the individual	Total Yes
					MPF: (%)	

APPENDIX A

SECTION V-A-2

EXECUTIVE EFFECTIVENESS REVIEW SKED PROFICIENCY FACTOR (SPF) WORKSHEET

(SKED 3.1 Users)

Ship	Department	Division	Work Center	Date

Individual Evaluated	**3-M Billet Assigned**

Proficiency Required				**Proficiency Attribute**	**Yes/No**
WCS	DO	DH	3-MC		
Work Center Actions					
X	X	X	X	Able to log on	
X	X	X	X	Able to open a Work Center	
X	X	X	X	Able to view the Cycle, Quarter, Weekly and Schedule List View	
X			X	Able to annotate Disposition of Maintenance	
X			X	Able to save a Work Center	
X			X	Able to back-up and restore a Work Center	
X			X	Able to modify Work Center Options	
X	X	X	X	Able to view Archive Quarter	
X	X	X	X	Able to view Component Row Properties	
X	X	X	X	Able to view Check Properties	
X	X	X	X	Able to update Spot Check Results	
X	X	X	X	Able to enter/view Flip Page Remarks	
Schedule Actions					
X	X	X	X	Able to add, delete or modify MIPs/MRCs in Data Entry Mode	
		X	X	Able to finalize the Cycle Schedule	
X	X		X	Able to adjust Quarter Start/End Dates	
		X	X	Able to finalize the Quarter Schedule	

Schedule Actions						
17		X		X	Able to generate the next Quarter Schedule	
18	X			X	Able to regenerate a Quarter	
19	X			X	Able to assign Maintenance Responsibilities	
20	X			X	Able to modify Equipment Associations (Server Installations only)	
21	X			X	Able to restart the Cycle Schedule	
22	X			X	Able to return the Quarter Schedule to Revise	
23	X			X	Able to generate an Open Work Candidate for Parts (Server Installations only)	
Event List Actions						
24	X			X	Able to create an Event List	
25	X			X	Able to add checks to an Event List	
26	X	X		X	Able to trigger a Local Event	
27				X	Able to trigger a Global Event	
Feed Back Report Actions						
28	X			X	Able to generate a Feed Back Report	
29		X	X	X	Able to Review/Approve a Feed Back Report	
Revision Actions						
30	X			X	Able to implement a Revision	
31			X	X	Able to finalize a Revision	
32	X			X	Able to perform Data Integrity and Periodicity Range checks	
Reports						
33	X	X	X	X	Able to generate and/or View PMS Reports	
Admin Actions						
34	X	X	X	X	Able to add Users	
35	X	X	X	X	Able to edit Users	

Admin Actions						
36	X			X	Able to inactivate Users	
37		X	X	X	Able to View/Modify the Chain of Command	
Totals						
30	17	17	37		Divide Total Yes by Proficiency Required totals for the billet held by the individual	Total Yes
					SPF: (%)	

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APPENDIX A

SECTION V-A-3

EXECUTIVE EFFECTIVENESS REVIEW REPORTING ASI PROCESSING CONFIDENCE FACTOR (RAF) WORKSHEET

ASSESSMENT ATTRIBUTES	Value	Grade
Equipment Validation Program		
Does the 3MC/MSC OBR maintain a master file or list to track Configuration Item Record Validations?	5	
SUSPENSE FILE SUMMARY STATISTICAL REPORT:		
Average age of all configuration transactions was 7 days or less. Points are awarded based on the number of days as follows:	10	
Average age of all configuration transactions awaiting review:		
7 days or less 10 points		
8-14 days 8 points		
15-20 days 4 points		
21-30 days 2 points		
over 30 days 0 points		
OMMS-NG SYSTEM MAINTENANCE REVIEW		
Is the import correction queue empty?	4	
Has Archive and Inactive been run in the last 15 days?	4	
Have Work Candidates been removed from past availabilities?	4	
Is the OMMS Server Reports Directory “h/OMMSBT/data/reports” being maintained?	4	
Is the OMMS Server Reports Directory “h/OMMSBT/data” being maintained?	4	
Does the Review and Approval queue have Work Candidates older than 7 days?	10	
Does the FAS have a tracking system for upline reporting?	4	
Does the FAS maintain a log tracking significant down time?	4	
Is there an effective process in place that deletes users as they transfer from the command?	4	
Is the availability used to track jobs rejected/questioned by the TYCOM MM empty?	4	
Are copies of the .uru and .pts file maintained on file until reporting activity acknowleges processing?	4	
CONFIGURATION MANAGEMENT		
Monthly follow-up action had been initiated with the CDM for CK’s awaiting response in excess of 180 days	10	
ASI PROCESSING		
Latest ASI file received has been processed. Points are awarded based on the backlog of ASI as follows:	10	
Up-to-date in ASI processing 10 points		
1 ASI file behind 8 points		
2 ASI file behind 6 points		
3 ASI file behind 4 points		

4 ASI file behind 2 points			
5 or more ASI file behind 0 points			
Are ASI Input and Summary Reports kept until all processing of the ASI has been completed?		10	
After processing, are ASI error reports sent to the CDM and to other activities as directed by the TYCOM?		10	
Totals (**Attributes evaluated as N/A are not calculated**)	Total Points Available	Total Points Awarded	
		RAF: (%)	

APPENDIX A

SECTION VI

3-M ASSESSMENT COMMAND TOTAL SCORE

1. The Ship's total score data shall be auto completed based on entries from Sections I through V of this Appendix.
2. Scoring shall be as indicated on the sample spread sheet provided in section VI-A of this Appendix.

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APPENDIX A

SECTION VI-A

SAMPLE 3-M ASSESSMENT TOTALS SPREAD SHEET

	Total Weight						Mean Score	Checks Scheduled	R-Checks Completed	Total Checks	Adjusted Value
		AER	ACF	CVF	PAR	Exec					
WORK CENTER	Divide the Total Checks for the Work Center by the Ship or Dept. by the Total Checks	Section I	Section II	Section III	Section IV	Section V	Ave Sect I-IV	All Scheduled Checks From SKED	All R MRCs Completed from previous 13 Weeks (count only one situational performance per week per MRC)	Add Scheduled Checks and R Checks	Multiply Total Weight and Mean Score
Engineering											
EA01						N/A					
EDC1						N/A					
EE01						N/A					
EM01						N/A					
RC01						N/A					
RL01						N/A					
		Ave AER	Ave ACF	Ave CVF	Ave PAR	If Applicable	Ave Dept	Total	Total	Total	
Executive	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
Ship Totals	N/A	Ave All W/C	Ave All W/C	Ave All W/C	Ave All W/C		N/A	Total All	Total All	Total All	N/A
Total Score	Average total AER, ACF, CVF, PAR, and Exec					>90% = Above Standards <90%->80% = At Standards <80% = Below Standards					

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APPENDIX B

FORMAT FOR REPORTING 3-M ASSESSMENTS

4790
Ser
Date

From: Accomplishing Activity
To: Commanding Officer (Commands Name and Hull Number (if applicable.)

Subj: REPORT OF 3-M ASSESSMENT OF

Ref: (a) NAVSEAINST 4790.8/OPNAVINST 4790.4; Ship's Maintenance and Material Management (3-M) Manual

(b) COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume VI, Chapter 19

Encl: (1) (as required)

1. In accordance with references (a) and (b), a 3-M Assessment of 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 Total Score _____

   b. 3-M Assessment _____
   (Above/At/Below Standards)

Copy to:
Immediate Superior In Command (with enclosures)
Type Commander (with enclosures)

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APPENDIX C

LISTING OF STANDARD WORK CENTER CODES

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APPENDIX C_1

STANDARD WORK CENTER CODES FOR NAVAL AIR FORCE SHIPS

1. Afloat Departmental Codes.

	WC CODE
Safety	A
Command Religious Ministries	B
Combat Systems	C
Deck	D
Engineering	E
Graphics Media	G
Aviation Intermediate Maintenance Department (AIMD)	I
Legal	L
Dental	MD
Medical	MH
Navigation	N
Operations	O
Maintenance	P
Reactor	R
Supply	S
Training	T
Air	V
Weapons	W
Adminstration	X
Airwing (when assigned)	Z

2. Afloat Professional WC Codes.

a.	Safety Department.	AS01
b.	Command Religious Ministries Department.	BC01
c.	Combat Systems Department Administration.	CS00
	Telecommunications Division Administration	CS10
	Message Processing	CS11
	Tech Control/Antenna	CS12
	Network Security Division Administration	CS20
	Information Systems Security	CS21
	Automated Data Processing Division Administration	CS30
	Unclassified Appts/Hardware/LAN	CS31
	Classified Appts/Hardware/LAN	CS32
	NTCSS	CS33
	PC Copier Repair	CS34
	Distributed Data Communications Maintenance (includes ICAN, DDCN, and MCS)	CS35
	Data Systems Division Administration	CS50
	C2/Display Systems Maintenance/ISIS	CS51
	Tactical USW Systems Maintenance	CS52
	INTEL Systems Maintenance	CS53

		WC CODE
	2-M Repair/Fiber Repair	CS54
	Tactical Data Links	CS55
	Radar Division Administration	CS60
	Air Traffic Control	CS61
	Surface Search/Air Search/IFF	CS62
	Navigation/NAVAIDS/Gyro	CS63
	Meteorology	CS64
	Test Equipment	CS65
	Combat Systems Department Tool Issue	CS66
	Self Defense Weapons Division Adminstration	CS70
	CIWS	CS71
	RAM	CS72
	NSSMS	CS73
	SPS-48/SPQ-9B/TAS	CS74
	IC Systems Division Administration	CS80
	SITE-TV	CS81
	Telephone	CS82
	Announcing Systems	CS83
	Alarm/Sensors	CS84
	External Communications Repair Division Administration	CS90
	HF/LOS/SATCOM Systems	CS91
	Peripherals/NAVMACS/Crypto Equip	CS92
	FDCS/BDCS/HYDRA	CS93
d.	Deck Department Adminstration.	DX00
	1st Division	DA01
	2nd Division	DB02
	3rd Division	DC03
e.	Engineering Department Administration.	EX00
	Auxiliaries Division Administration	EA00
	Hydraulics	EA01
	Steam Heat/Galley/Laundry	EA02
	Air Conditioning & Refrigeration	EA03
	Diesels (CVN-65)	EA04
	Oxygen & Nitrogen	EA06
	Boats	EA07
	Outside Repair	EA08
	Catapult Steam	EA10
	Filter Shop	EA11
	Waste Management	EA14
	Damage Control Division Administration	ED00
	Damage Control Training	ED01
	Chemical/CBR-D	ED02
	Damage Control Systems	ED03
	SCBA/BARS/SAR-SCBA/EBACS/Gas Free	ED04

		WC CODE
	Damage Control Repair Stations	ED05
	Electrical Division Administration	EE00
	Lighting/Battery Shop	EE01
	Rewind	EE02
	Power (Non-nuclear)/General	EE03
	Hotel Services	EE04
	Electrical Safety	EE20
	Machinery Division.	
	#1 Plant Machinery Division (CVN-65)	EM11
	#4 Plant Machinery Division (CVN-65)	EM14
	#2 Plant Machinery Division (CVN-65)	EM22
	#3 Plant Machinery Division (CVN-65)	EM23
	#1 Auxiliary Machinery Room (CVN-65)	EM31
	#2 Auxiliary Machinery Room (CVN-65)	EM32
	Repair Division Administration	ER00
	General Work Shop	ER01
	Carpenter	ER02
	Pipe Shop/Marine Sanitation Device (MSD)	ER03
	Machine Shop/Locksmith	ER04
f.	Graphics Media Department Administration.	GM00
	PAO	GM11
	Photo Shop	GM12
	Print Shop	GM13
g.	AIMD Department Administration.	IM00
	PC/QA division (NALCOMIS reported equipment)	IM01
	Mechanical Repairs	IM02
	Avionics	IM03
	Ground Support	IM04
	Field Calibration Activity	FCA1
h.	Legal Department.	LN01
i.	Health Services.	
	Dental Department	MD01
	Medical Department	MH01
j.	Navigation Department.	NN01
k.	Operations Dept Administration.	OX00
	Meteorological	OA01
	Air Ops/CATCC	OC01
	Security Department Administration (when assigned).	OF00

		WC CODE
	Ship's Security Force	OF01
	Force Protection	OF02
	Brig	OF03
	CDC	OI01
	Undersea Warfare/Acoustics	OM01
	Comm Intel/SESS	OS01
	Electronic Warfare	OS02
	Intelligence Department Administration (when assigned).	OZ00
	Intelligence	OZ01
l.	Maintenance Department Administration (when assigned).	PM00
	3-M	PM01
	MSC	PM02
	Quality Assurance (QA)	PM03
m.	Reactor Department Administration.	RX00
	Reactors Auxiliaries Division Administration	RA00
	Emergency Diesels	RA01
	Reactor Controls Division Administration	RC00
	#1 Reactor Plant	RC11
	#1 Reactor Plant (Non-Nuclear CVN-68 Class)	RC12
	#4 Plant Reactor Control Division (CVN-65)	RC14
	#2 Reactor Plant (CVN-68 Class)	RC21
	#2 Reactor Plant (CVN-65, (Non-Nuclear CVN-68 Class)	RC22
	#3 Plant Reactor Controls Division (CVN-65)	RC23
	Reactor Instrumentation and Maintenance	RC30
	Reactor Electrical Division Administration	RE00
	#1 Reactor Plant	RE11
	#1 Reactor Plant (Non-Nuclear CVN-68 Class)	RE12
	#4 Reactor Plant (CVN-65)	RE14
	#2 Reactor Plant (CVN-68 Class)	RE21
	#2 Reactor Plant (CVN-65, (Non-Nuclear CVN-68 Class)	RE22
	#3 Reactor Plant (CVN-65)	RE23
	Tool Issue and Technical Support	RE30
	Reactor Laboratory Division Administration	RL00
	#1 and #4 Reactor Plants (CVN-65)	RL00
	#2 and #3 Reactor Plants (CVN-65)	RL01
	#1 Reactor Plant (CVN-68 Class)	RL11
	#1 Reactor (Non-Nuclear CVN-68 Class)	RL12
	#2 Reactor Plant (CVN-68 Class)	RL21
	#2 Reactor (Non-Nuclear CVN-68 Class)	RL22

		WC CODE
	Dosimetry	RL30
	Reactor Mechanical Division Administration	RM00
	#1 Reactor Room	RM11
	#1 Reactor Room (Non-Nuclear CVN-68 Class)	RM12
	#4 Reactor Room (CVN-65)	RM14
	#2 Reactor Room (CVN-68 Class)	RM21
	#2 Reactor Room (CVN-65, (Non-Nuclear CVN-68 Class)	RM22
	#3 Reactor Room (CVN-65)	RM23
	Technical Support	RM30
	Reactor Propulsion Division Administration	RP00
	#1 Main Machinery Room (CVN-68 Class)	RP01
	#2 Main Machinery Room (CVN-68 Class)	RP02
	Shaft Alley/Reboiler/Oily Waste (CVN-68 Class)	RP05
	Technical Support	RP30
	Reactor Training Division Administration	RT00
	Student Training	RT01
n.	Supply Department Administration.	SS00
	S-1 Stock Control	SS01
	S-2 Food Services	SS02
	S-3 Retail Operations	SS03
	S-4 Disbursing	SS04
	S-5 Hotel Services	SS05
	S-6 Aviation Support	SS06
	S-7 Morale, Welfare and Recreation	SS07
	S-8 Material	SS08
	S-8A Hazardous Material	SS09
	S-10 Supply Quality Assurance	SS10
	S-11 CPO Mess	SS11
	S-1A Customer Service (Post Office)	SS12
	S-13 Supply Department 3M/DC	SS13
o.	Training Department.	TX01
p.	Air Department Administration.	VV00
	V1 Division Administration	VA00
	Flight Deck	VA01
	Crash and Salvage	VA02
	V2 Division Administration	VB00
	#1 Catapult	VB01
	#2 Catapult	VB02
	#3 Catapult	VB03
	#4 Catapult	VB04
	#1 Arresting Gear	VB05
	#2 Arresting Gear	VB06

		WC CODE
	#3 Arresting Gear	VB07
	#4 Arresting Gear (#3A CVN-76 Class)	VB08
	Barricade	VB09
	Improved Fresnel Lens Optical Landing System (IFLOLS)	VB10
	Integrated Launch and Recovery Television System (ILARTS)	VB11
	Flight Deck Lighting	VB12
	Maintenance Control	VB20
	QA	VB21
	Maintenance Support	VB22
	V3 Division Administration.	VC00
	Hanger Deck	VC01
	V4 Division Administration.	VF00
	JP-5 Hanger Deck/Flight Maintenance	VF01
	JP-5 Below Deck Equipment Maintenance	VF02
	EM and IC Repair	VF03
	JP-5 QA/Testing Lab	VF04
	V5 Division Administration.	VX00
	PRIFLY	VX01
q.	Weapons Department Administration.	WG00
	Weapons Handling G1 Division	WG01
	Ship's Armory G2 Division	WG02
	Weapons Magazine G3 Division	WG03
	Weapons Elevator G4 Division	WG04
	Weapons Control G5 Division	WG05
	Weapons Electrical Tool Issue	WG20
r.	Administration Department.	
	CO's Admin	XX01
	XO's Admin	XX02
	Administration	XX03
	Personnel	XX04
	Special Assistants - ESO/CCC/CMC/DAPA/EOA	XX05
	Flag/Embarked Staff	XF01
s.	Airwing (when assigned).	
	CAG	ZW00
	Reserved for Assignment to Embarked Airwings	ZW01 thru ZW11

3. Afloat Damage Control WC Codes.

a.	Safety Department DC.	AS40

		WC CODE
b.	Command Religious Ministries Department DC.	BC40
c.	Combat Systems Department DC (note 1).	CS40
	Telecommunications Division DC	CS41
	ADP Division DC	CS43
	Data Systems Division DC	CS45
	Radar Division DC	CS46
	Self Defense Weapons Division DC	CS47
	IC Systems Division DC	CS48
	External Communications Repair Division DC	CS49
d.	Deck Department DC (note 1).	DX40
	1st Division DC	DA40
	2nd Division DC	DB40
	3rd Division DC	DC40
e.	Engineering Department DC (note 1).	EX40
	Auxiliaries Division DC	EA40
	Damage Control Division DC	ED40
	Electrical Division DC	EE40
	Machinery Division DC (CVN-65)	EM40
	Repair Division DC	ER40
f.	Graphics Media Department DC.	GM40
g.	AIMD Department DC (note 1).	IM40
	IM1 Division DC	IM41
	IM2 Division DC	IM42
	IM3 Division DC	IM43
	IM4 Division DC	IM44
h.	Legal Department DC.	LN40
i.	Health Services.	
	Dental Department DC	MD40
	Medical Department DC	MH40
j.	Navigation Department DC.	NN40
k.	Operations Department DC (note 1).	OX40
	OA Division DC	OA40
	OC Division DC	OC40
	OF Division/Department DC (as assigned)	OF40
	OI Division DC	OI40
	OS Division DC	OS40
	OZ Division/Department DC (as assigned)	OZ40

		WC CODE
l.	Maintenance Division/Department DC (as assigned).	PM40
m.	Reactor Department DC.	RX40
n.	Supply Department DC (note 1).	SS40
	S-1 Stock Control	SS41
	S-2 Food Services	SS42
	S-3 Retail Operations	SS43
	S-4 Disbursing	SS44
	S-5 Hotel Services	SS45
	S-6 Aviation Support	SS46
	S-7 Morale, Welfare and Recreation	SS47
	S-8 Material	SS48
	S-8A Hazardous Material	SS49
	S-10 Supply Quality Assurance	SS50
	S-11 CPO Mess	SS51
	S-1A Customer Service (Post Office)	SS52
o.	Training Department DC.	TX40
p.	Weapons Department DC (note 1).	WG40
	G1 Division DC	WG41
	G2 Division DC	WG42
	G3 Division DC	WG43
	G4 Division DC	WG44
	G5 Division DC	WG45
q.	Air Department DC (note 1).	VV40
	V1 Division DC	VA40
	V2 Division DC	VB40
	V3 Division DC	VC40
	V4 Division DC	VF40
	V5 Division DC	VX40
r.	Administration Department DC.	XX40

Note 1: Damage Control (DC) work centers are assigned at the division level, therefore, the department work center is usually not applicable. When authorized by the Commanding Officer to combine division DC work centers at the departmental level, the division work center is not applicable.

4. Afloat Maintenance Availability WC Codes.

a.	Ship Alteration (N/A for Ship's Force, used by TYCOM for planning purposes).	
	Combat Systems SCD	CSSA
	Deck Department SCD	DXSA
	Engineering Department SCD	EXSA
	AIMD SCD	IMSA
	Health Services Department SCD	MXSA

	WC CODE
Navigation Department SCD	NNSA
Operations Department SCD	OXSA
Reactor Department SCD	RXSA
Reactor Department TYCOM Alts	RXTY
Supply Department SCD	SSSA
Air Department SCD	VXSA
Weapons Department SCD	WGSA
Graphics Media Department SCD	GMSA

b. Availability Maintenance Teams.

Work Control	PM10
Habitability	PM11
Paint	PM12
Deck	PM13
Valve Barge	PM14
Vent Cleaning	PM15
Tank and Void	PM16
Cable Way	PM17
Door Repair	PM18
GSE	PM19
Lagging	PM20
Joiner Door Repair	PM21
Ladder Repair	PM22
Electrical Repair	PM23
Fan Room Restoration	PM24
LIFAC	PM25
Plenum Repair	PM26
Matting	PM27
Interior Communications	PM28
Head Repair	PM29
Damage Control	PM30
Island Painting	PM31
JP-5	PM32

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APPENDIX C_2

STANDARD WORK CENTER CODES FOR NAVAL EXPEDITIONARY COMBAT COMMAND

Appendix C_2A	Standard Work Center Codes for Explosive Ordinance Disposal Units
Appendix C_2B	Standard Work Center Codes for Mobile Diving and Salvage Units
Appendix C_2C	Standard Work Center Codes for EOD Training Evaluation Units
Appendix C_2D	Standard Work Center Codes for Mobile Security Squadrons/Navy Coastal Warfare Squadrons
Appendix C_2E	Standard Work Center Codes for RIVERINE Squadrons
Appendix C_2F	Standard Work Center Codes for Navy Mobile Construction Battalions
Appendix C_2G	Standard Work Center Codes for SEABEE Readiness Group
Appendix C_2H	Standard Work Center Codes for Construction Battalion Mobile Units
Appendix C_2I	Standard Work Center Codes for Underwater Construction Teams
Appendix C_2J	Standard Work Center Codes for Navy Mobile Construction Battalions Forward Headquarters
Appendix C_2K	Standard Work Center Codes for NCF FWD Detachments
Appendix C_2L	Standard Work Center Codes for Navy Expeditionary Logistics Support Group
Appendix C_2M	Standard Work Center Codes for Navy Cargo Handling Battalion ONE

NOTES:

1. It is recommended all units under COMNECC develop a tool room or shop for maintenance and distribution of tools used for maintenance.
2. Some units are not large enough to incorporate three different Communication Work Centers. In such cases, all aspects of Information Technology will be incorporated into one Work Center (CS02).
3. All detachments that serve a specific purpose as listed in this instruction shall use the first two letters as indicated in Appendices C2A through C2M and the first two numbers of the detachment provided it is not duplicated within the same Unit Identification Code.
4. Shore Detachments assigned outside the continental United States shall use the two letter country code in which they are located and the first two numbers of the detachment or unit number. Detachments within the United States shall use appropriate designator identified within this Appendix.
5. Multiple boat and service craft Work Centers shall use concurrent numbering to identify follow on Work Centers of the same type (e.g., CA01, CA02, etc.).

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APPENDIX C_2A

STANDARD WORK CENTER CODES FOR EXPLOSIVE ORDINANCE DISPOSAL UNITS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	ALL
	Administration Division	XX01	ALL
	Administration	XX02	ALL
	Safety	XS01	ALL
Medical Department		MH00	ALL
	Medical Division	MH01	ALL
	Medical	MH02	ALL
Supply Department		SUPP	ALL
	Supply Division	SS01	ALL
	Central Tool Room	SC01	NOTE 1
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	DTO	SS01	
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Weapons Department		WG00	
	Weapons Division	WG01	ALL
	Weapons (Small Arms)	WG02	ALL
	Weapons (Crew Served)	WG03	
Maintenance Department		AA00	
	Maintenance Division	AA01	
	Builder Shop	MR01	ALL
	CESE/Vehicles	AL01	ALL
	Dispatch	AO01	ALL
	Boat Shop Division	DA01	ALL
	Utility Craft	CU01	NOTE 5
	Small Boats (Inflatable)	CR01	ALL
	Repair (Hull/Fabrication/ Welding)	ER01	ALL
	Electric Shop	EE01	ALL
	Engineering DC Equipment	ER02	ALL
	Engine Shop	EA01	ALL
Readiness and Training		TT00	
	Training Division	TT01	ALL
	Dive Locker Division	DV01	ALL
	Dive Work Center	DC01	ALL
	Dive Chamber Systems Division	DS01	ALL

STANDARD WORK CENTER CODES FOR EXPLOSIVE ORDINANCE DISPOSAL UNITS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
	Dive Systems Work Center	DS02	Fly Away
	Recompression Chamber	DC01	A/R
	Air Operations	VA01	A/R
Communication Department		CS00	ALL
	Communications Division	CS01	NOTE 2
	Radio Work Center	CS02	A/R
	ADP Center	CS03	A/R
	ET Shop	CS04	A/R
Operations Department/ Detachments			NOTE 3
	EOD DET	EX##	ALL
	EOD Equipment	EO##	A/R
	Dive Equipment	DV##	A/R
	FADL	DL01	ALL
	Magnetometer	DM01	ALL
	Shore DETS		NOTE 4
	Mine Counter Measures	MC##	A/R
	Combat Expeditionary Support	CE##	A/R
	Special Operation Force	SF##	A/R
	Underwater/IED	UD##	A/R
	Surface/IED	SD##	A/R
	Chemical NUC	CZ##	A/R
	Mobile Ashore Support Team	RS02	ALL

APPENDIX C_2B

STANDARD WORK CENTER CODES FOR MOBILE DIVING AND SALVAGE UNITS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	ALL
	Administration Division	XX01	ALL
	Administration	XX02	ALL
	Safety	XS01	ALL
Medical Department		MH00	ALL
	Medical Division	MH01	ALL
	Medical	MH02	ALL
Supply Department		SUPP	ALL
	Supply Division	SS01	ALL
	Central Tool Room	SC01	NOTE 1
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	DTO	SS01	A/R
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Weapons Department		WG00	ALL
	Weapons Division	WG01	ALL
	Weapons (Small Arms)	WG02	ALL
	Weapons (Crew Served)	WG03	A/R
Maintenance/Support Department		AA00	ALL
	Maintenance Division	AA01	ALL
	CESE/Vehicles	AL01	ALL
	Dispatch	AO01	ALL
	Boat Shop (Deck)	DA01	ALL
	Small Boats (Inflatable)	DB01	ALL
	Repair (Hull/Fabrication/ Welding)	ER01	ALL
	Engineering DC Equipment	ER02	ALL
	Engine Shop	EA01	ALL
	Salvage Gear (Yellow Gear)	SG01	ALL
Readiness and Training	Chamber Systems	DS01	ALL
Operations Department/ Detachments			
	Detachment 2 (LANT)	SE02	
	Detachment 3 DV (PAC)	SE03	
	Detachment 3 SL (PAC)	SE33	
	Detachment 4 (LANT)	SE04	
	Detachment 5 DV (PAC)	SE05	

STANDARD WORK CENTER CODES FOR MOBILE DIVING AND SALVAGE UNITS (Cont'd)

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
	Detachment 5 SL (PAC)	SE55	
	Detachment 6 (LANT)	SE06	
	Detachment 7 DV (PAC)	SE07	
	Detachment 7 SL (PAC)	SE77	
	Detachment 8 (LANT)	SE08	
	Detachment 9 DV (PAC)	SE09	
	Detachment 9 SL (PAC)	SE99	
	Detachment 10 (LANT)	SE10	
	Detachment 11 DV (PAC)	SE01	
	Detachment 11 SL (PAC)	SE11	
	Detachment 12 (LANT)	SE12	
	Detachment 20 (LANT)	SE20	
	Detachment 13 DV (PAC)	SE13	
	Detachment 13 SL (PAC)	SE31	
	Detachment 30 (LANT)	SE30	
	Communications	CS01	

APPENDIX C_2C

STANDARD WORK CENTER CODES FOR EOD TRAINING EVALUATION UNITS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	ALL
	Administration Division	XX01	ALL
	Administration	XX02	ALL
	Safety	XS01	ALL
Medical Department		MH00	ALL
	Medical Division	MH01	ALL
	Medical	MH02	ALL
Supply Department		SUPP	ALL
	Supply Division	SS01	ALL
	Central Tool Room	SC01	NOTE 1
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	DTO	SS01	A/R
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Weapons Department		WG00	ALL
	Weapons Division	WG01	ALL
	Weapons (Small Arms)	WG02	ALL
	Weapons (Crew Served)	WG03	A/R
Maintenance Department		AA00	ALL
	Maintenance Division	AA01	ALL
	CESE/Vehicles	AL01	ALL
	Dispatch	AO01	ALL
	Boat Shop Division	DA01	ALL
Readiness and Training		RD00	A/R
	Training Division	TT01	ALL
	Dive Lockers	DV01	ALL
	Air Operations	VA01	ALL
Communication Department		CS00	NOTE 2
	Communications Division	CS01	ALL
	ADP Center	CS02	A/R
	ET Shop	CS03	
Operations Department/ Detachments			
	Ordinance Clearing Diver	ED##	ALL
	Dive Chamber Systems	DS##	ALL
	Shore DETS		
	Underwater/IED	UD##	
	Surface/IED	SD##	
	Chemical NUC	CZ##	
	Dive Locker	DV01	

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APPENDIX C_2D

STANDARD WORK CENTER CODES FOR MOBILE SECURITY SQUADRON/NAVY COASTAL WARFARE SQUADRON

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	ALL
	Administration Division	XX01	ALL
	Administration	XX02	ALL
	Safety	XS01	ALL
Medical Department		MH00	ALL
	Medical Division	MH01	ALL
	Medical	MH02	ALL
Supply Department		SUPP	
	Supply Division	SS01	ALL
	Central Tool Room	SC01	NOTE 1
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	DTO	SS01	
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Weapons Department		WG00	
	Weapons Division	WG01	ALL
	Weapons (Small Arms)	WG02	ALL
	Weapons (Crew Served)	WG03	
Maintenance Department		AA00	
	Maintenance Division	AA01	
	CESE/Vehicles	AL01	ALL
	Dispatch	AO01	ALL
	Boat Shop	DA01	ALL
	Repair (Hull/Fabrication/ Welding)	ER01	ALL
Training		TT00	ALL
Operations Department		CS00	
	Operations Division		
	Mobile Ashore Support Team	RS02	ALL
	Radar Sonar Surveillance Center (RSSC)	RS01	ALL
	Maritime Operations Center	OC01	ALL
	Communications	CS01	NOTE 2
	ADP Center	CS02	
	ET Shop	CS03	

STANDARD WORK CENTER CODES FOR MOBILE SECURITY SQUADRON/NAVY COASTAL WARFARE SQUADRON (Cont'd)

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Boats and Service Craft		DB00	NOTE 5
	Boat Division	DB01	
	Patrol Craft	CP01	ALL
	Utility Craft	CU01	ALL

APPENDIX C_2E

STANDARD WORK CENTER CODES FOR RIVERINE SQUADRONS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	ALL
	Administration Division	XX01	ALL
	Administration	XX02	ALL
	Safety	XS01	ALL
Medical Department		MH00	ALL
	Medical Division	MH01	ALL
	Medical	MH02	ALL
Supply Department		SUPP	
	Supply Division	SS01	ALL
	Central Tool Room	SC01	NOTE 1
	Central Store Room	ST01	ALL
	Stock Control	STK	ALL
	HAZMAT	HZ01	ALL
Weapons Department		WG00	
	Weapons Division	WG01	ALL
	Weapons (Small Arms)	WG02	ALL
	Weapons (Crew Served)	WG03	ALL
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Boat Shop		DA00	
	Boat Division	DA01	ALL
	Boat Work Center (Maint)	DA02	
	Boats (Individual)	CA01	A/R
CESE Maintenance Department		AA00	
	Maintenance Division	AA01	
	CESE Maintenance	AA02	ALL
	CESE/CEEI	AL01	ALL
	Dispatch	AO01	
Communication Department		CS00	ALL
	Communications Division	CS01	ALL
	Radar	CS02	ALL
	Radio	CS03	ALL

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APPENDIX C_2F

STANDARD WORK CENTER CODES FOR NAVY MOBILE CONSTRUCTION BATTALIONS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	ALL
	Administration Division	XX01	ALL
	Administration	XX02	ALL
	Safety	XS01	ALL
Medical Department		MH00	ALL
	Medical Division	MH01	ALL
	Medical	MH02	ALL
	Dental	MH03	ALL
Supply Department		SUPP	
	Supply Division	SS01	ALL
	Central Tool Room	SC01	ALL
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	DTO	SS01	
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Alfa Company		AA00	
	Alfa Division	AA01	ALL
	Cranes	AC13/AC15	ALL
	Heavy Shop (CESE)	AH03/AH05	ALL
	Light Shop (CESE)	AL03/AL05	ALL
	Mineral Products	AM05	ALL
	Machine Shop	AS01	ALL
	5000 Shop	AT03/AT05	ALL
	Dispatch	AO01	ALL
Bravo Company		BB00	ALL
	Bravo Co. Division	BB01	ALL
	BU/SW Shop	BU01	ALL
	UT/CE Shop	BE01	ALL
	CBR	BR01	ALL
Training		TT00	ALL
	Training Division	TT01	ALL
	Weapons (Small Arms)	WG01	ALL
	Weapons (Crew Served)	WG02	
Communication Department		CS00	ALL
	Communications Division	CS01	ALL
	Communications Work Center	CS02	ALL

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APPENDIX C_2G

STANDARD WORK CENTER CODES FOR SEABEE READINESS GROUP

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Alfa Company		AA00	
	Alfa Division	AA01	ALL
	Cranes	AC03/AC13	ALL
	Heavy Shop (CESE)	AH03/AH13	ALL
	Light Shop (CESE)	AL03/AL13	ALL
	Mineral Products	AM05	ALL
	Machine Shop	AS01	ALL
	5000 Shop	AT03/AT13	ALL
	Dispatch	AO01/AO11	ALL
Bravo Company		BB00	
	Bravo Division	BB01	
	Builder/SW Shop	BU01	
	CE/UT Shop	BE01	
	CEEI - TOA	BT01	
	CBR	BR01	ALL
Training Department		TT00	ALL
	Training Division	TT01	
	SRG Weapons (Small Arms)	WG01	
	SRG Weapons (Crew Served)	WG02	
	BATT Set #1 (Small Arms)	WG11	
	BATT Set #1 (Crew Served)	WG12	
	BATT Set #2 (Small Arms)	WG21	
	BATT Set #2 (Crew Served)	WG22	
	BATT Set #3 (Small Arms)	WG31	
	BATT Set #3 (Crew Served)	WG32	
Communication Department		CS00	ALL
	Communications Division	CS01	ALL
	SRG	CS02	ALL
	BATT Set #1	CS03	
	BATT Set #2	CS04	
	BATT Set #3	CS05	

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APPENDIX C_2H

STANDARD WORK CENTER CODES FOR CONSTRUCTION BATTALION MOBILE UNITS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	ALL
	Administration Division	XX01	ALL
	Administration	XX02	ALL
	Safety	XS01	ALL
	Medical	MH01	ALL
Supply Department		SUPP	
	Supply Division	SS01	ALL
	Central Tool Room	SC01	NOTE 1
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	Material Liaison Office	SM01	
	DTO	SS01	
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Alfa Company		AA00	ALL
	Alfa Division	AA01	ALL
	Heavy Shop (CESE)	AH03	ALL
	Light Shop (CESE)	AL03	ALL
	Dispatch	AO01	ALL
	Augment Equipment	AG05	
	5000 Shop	AT03	
Bravo Company		BB00	
	Bravo Division	BB01	
	Builder/SW Shop	BU01	
	CE/UT Shop	BE01	
	CEEI - TOA	BT01	
	CBR	BR01	ALL
Communication		CS00	
	Communications Division	CS01	ALL
	Tactical COMMS	CS02	ALL
Training		TT01	ALL
	Training Division	TT02	ALL
	Weapons Division (Small Arms)	WG01	ALL
	Weapons Division (Crew Served)	WG02	ALL
Detachments DC			
	Maintenance Division (CESE)	D103	
	Organic CESE	D104	
	Augment CESE	D105	
	Dispatch	D106	

STANDARD WORK CENTER CODES FOR CONSTRUCTION BATTALION MOBILE UNITS (Cont'd)

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
	Maintenance Division (Non-CESE)	D108	
	Builder/SW Shop	D109	
	CE/UT Shop	D110	
	CEEI/CBR	D111	
	Weapons Division-TOA	D112	
	Safety/HAZMAT	D113	
	Central Tool Room	D114	

202 DET PREFIX CODES

DET DC - D1
DET KB - D2
DET JAX -D3
DET KW - D4
DET CL - D5

303 DET PREFIX CODES

DET Bangor - D1
DET Fallen - D2
DET Lemoore - D3
DET Pearl Harbor - D4

APPENDIX C_2I

STANDARD WORK CENTER CODES FOR UNDERWATER CONSTRUCTION TEAMS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	ALL
	Administration Division	XX01	ALL
	Administration	XX02	ALL
	Safety	XS01	ALL
	Engineering Aid	XE01	ALL
Medical Department		MH00	ALL
	Medical Division	MH01	ALL
	Medical	MH02	ALL
Supply Department		SUPP	
	Supply Division	SS01	ALL
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	DTO	SS01	
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Training		TT00	ALL
	Training Division	TT01	ALL
	Weapons (Small Arms)	WG01	ALL
	Weapons (Crew Served)	WG02	
Communication		CS00	
	Communications Division	CS01	ALL
	Communications	CS02	ALL
Readiness Department		RD00	ALL
	Readiness Division	RD01	ALL
	Boat Shop	DA01	ALL
	Maintenance (CESE)	AL01	ALL
	Dive Systems	DS00	ALL
	Fly Away Dive System	DC00	ALL
	SNDL Recompression Chamber	DC04	ALL
	Dive Equipment	DL01	ALL
	Central Tool Room	SC01	ALL
	Facilities	NF02	ALL
Operations Department		OD00	ALL
	Operations Division	OD01	ALL
	Air DET ALFA	AD01	
	BRAVO	AD02	ALL
	CHARLIE	AD03	
	Lightweight Dive System	DS11/DS12/DS13	ALL
	Trans. Recompression Chamber	DC11/DC12/DC13	ALL

STANDARD WORK CENTER CODES FOR UNDERWATER CONSTRUCTION TEAMS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
	TOA Equipment (Non-CESE)	TA11/TA12/TA13	ALL
	Weapons	WG11/WG12/WG13	ALL
	Communications	CS11/CS12/CS13	ALL
	Dive Boat	CU11/CU12/CU13	ALL

APPENDIX C_2J

STANDARD WORK CENTER CODES FOR NAVY MOBILE CONSTRUCTION BATTALIONS FORWARD HEADQUARTERS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX01	ALL
	PS/YN Division	XX02	ALL
	Medical	MH01	ALL
	3MC	XO01	ALL
Communication Department		CS01	
	Communications	CS02	
Supply Department		SS01	
	Supply DIV	SS02	
	Central Tool Room	SS03	
	Material Liaison Office	SS04	
	Control Store Room	SS05	
	DTO	SS01	
Stock Department		STCK	
	Stock Div	STOK	
	Stock	STK	

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APPENDIX C_2K

STANDARD WORK CENTER CODES FOR NCF FWD DETACHMENTS

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Detachment 3MA		XO11	
CESE Maint Div		AA11	
	CESE/CEEI Maintenance	AL11	
	Dispatch	AO11	
Non-CESE Maint Div		BC11	
	Weapons Division	WG11	
	Safety/HAZMAT	SZ11	
	Communication	CS11	
DET Supply		SS11	
	Central Tool Room	SC11	

Detachment Codes

11 - Camp Moreell	12 - Falluja
13 - Balad	14 - TQ
15 - Al Asad	16 - Ramadi
17 - Bagram	

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APPENDIX C_2L

STANDARD WORK CENTER CODES FOR NAVY EXPEDITIONARY LOGISTICS SUPPORT GROUP

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	
	Administration Division	XX01	
	Administration	XX02	
	Safety	XS01	
	Medical	MH01	
Supply Department		SUPP	
	Supply	SS01	
	Central Tool Room	SC01	NOTE 1
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	DTO	SS01	
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Operations Department		OD00	
	Operations	OD01	
Planning Department		PA00	
	Plans	PA01	
Training		TT00	ALL
	Training Support	TT01	ALL
Communication Department		CS00	NOTE 2
	Communications	CS01	
	ADP Center	CS03	
Engineering Department		AA00	
	CESE/Vehicles	AL01	ALL
	Dispatch	AO01	ALL
	Engineering (DC Equip/ Facilities)	ER02	ALL
	Non-CESE (Hatch Boxes)	EH01	
	Weapons Division	WG01	ALL
	Weapons (Small Arms)	WG02	ALL
	Weapons (Crew Served)	WG03	

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APPENDIX C_2M

STANDARD WORK CENTER CODES FOR NAVY CARGO HANDLING BATTALION ONE

WORK CENTER NAME	DIVISION W/C	W/C CODES	UNIT(S)
Administration Department		XX00	
	Administration Division	XX01	
	Administration	XX02	
	Safety	XS01	
	Medical	MH01	
Supply Department		SUPP	
	Supply Division	SS01	
	Central Tool Room (Hatch Boxes)	SC01	NOTE 1
	Central Store Room	ST01	ALL
	HAZMAT	HZ01	ALL
	DTO	SS01	
Stock Department		STCK	ALL
	Stock Division	STOK	ALL
	Stock	STK	ALL
Operations Department		OD00	NOTE 2
	Operations Division	OD01	
	Plans	PA01	
	Communications	CS01	
	ADP Center	CS03	
Training		TT00	ALL
	Training Support Division	TT01	ALL
	CISO	TT02	
	Schedules/Quotas	TQ01	
	Graphics	TG01	
	School House	TS01	
	Curriculum	TS01	
Platforms		PA00	
	Platforms Division	PA01	
	Land Ship	PL01	
	Cape Ship	PS01	
	Crane Site	PC01	
Engineering Department		AA00	
	CESE/Vehicles Division	AL01	ALL
	Dispatch	AO01	ALL
	Engineering (DC Equip/Facilities)	ER02	ALL
	Non-CESE (Hatch Boxes)	EH01	
	Weapons Division	WG01	ALL
	Weapons (Small Arms)	WG02	ALL
	Weapons (Crew Served)	WG03	

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APPENDIX C_3

STANDARD WORK CENTER CODES FOR NAVAL SUBMARINE FORCE SHIPS

Appendix C_3A	Standard Work Center Codes for Submarines
Appendix C_3B	Standard Work Center Codes for Submarine Force Surface Ships
Appendix C_3C	Standard Work Center Codes for Small Boat and Service Craft Managers (Submarine Force Only)
Appendix C_3D	Standard Work Center Codes for Tugs and Retrievers (Submarine Force Only)

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APPENDIX C_3A

STANDARD WORK CENTER CODES FOR SUBMARINES

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
Machinery	All	EM01
Engineering Administration	All	EX00
Engineering Log Room	All	EX02
Field Calibration	All	FCA1
Reactor Controls	All Nuclear	RC01
Engineering Laboratory	All	RL01
Medical		
Medical	All	MH01
Navigation/Operations		
Navigation/Electronics	All	NE01
Micro Miniature Repair (2M)	SSBN/SSGN	NE02
Radio/Communications	All	OC01
Afloat Information Systems/Automated Data Processing Coordinator (AIS/ADP)	All	OC02
Navigation/Operations Administration	All	OX00
Research and Development		
Mission Auxiliary	SSN-23 Only	MA01
Mission Electronics	SSN-23 Only	ME01
Mission Navigation	SSN-23 Only	MN01
Description	**Used by Submarine Type**	**Code**
Research and Development (Cont'd)		

Description	Used by Submarine Type	Code
Mission Vehicle Support	SSN-23 Only	MV01
Mission Auxiliary Support	SSN-23 Only	MV02
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/Advanced SEAL Delivery System	DDS/ASDS Host Hulls Only	WK02
Sonar	All	WQ01
Torpedo	All	WI01
Missile Technicians	SSBN/SSGN	WM01
Missile Launcher	All	WS01
Weapons Administration	All	WX00

Note:

1. When Squadron must generate a CSMP deferral for the submarine, the Squadron will use the correct ship's work center and the Job Sequence Number (JSN) that is generated by Regional Maintenance Automated Information System (RMAIS). Example: EM01-Q123, Q denotes that the JSN was created by RMAIS.

APPENDIX C_3B

STANDARD WORK CENTER CODES FOR SUBMARINE FORCE SURFACE SHIPS

Description	Used by Ship Type	Code
Deck		
1st Division	ARDM	DA01
Boat Division	AS/ARDM	DB01
Engineering		
Auxiliary Division	ARDM	EA01
Crane Maintenance	ARDM	EC01
Lighting and Power	ARDM	EE01
Pipe/Metal Shop	ARDM	ER01
Carpenter/Docking	ARDM	ER02
Damage Control Petty Officer	All	EDC1
Engineering Administration	All	EX00
Engineering Logroom	All	EX02
Calibration	ARDM	FCA1
Medical		
Medical	All	MH01
Dental	AS	MD01
Navigation/Operations		
Afloat Information Systems/Automated Data Processing Coordinator (AIS/ADP)	All	OC02
Supply		
Supply Administration	All	SX00
General Stores/Supply	All	SS01
Ship's Store	AS	SS03
Disbursing	AS	SS04
Inventory Control	AS	SS05
SUBSAT	AS	SS07
Post Office	AS	SS08
ROVSS	AS	SS09
Weapons		
Armory/Magazine	AS	WK02
Gunnery	AS/ARDM	WI05
Weapons Administration	All	WX00

STANDARD WORK CENTER CODES FOR SUBMARINE FORCE SURFACE SHIPS (Cont'd)

Description	Used by Ship Type	Code
Weapons Repair	AS	W10B
Fire Control Repair	AS	W67E
Weight Test	AS	W72D
Weapons Alarms systems	AS	W91D
Torpedo/Missiles repair	AS	W91E
Weapons QA	AS	W91Q
Executive		
Executive Administration	AS	XX00
3-M Coordinator	All	XM01
Safety Petty Officer	All	SP01
Personnel Office	All	XX02
Repair		
Tool Room	AS	R06B
Repair Administration	AS	R10A
Planning P&E	AS	R10C
Tech Library	AS	R10E
Shipfitter/welding	AS	R11A
Sheet metal/Wood working	AS	R17A
Shore Services	AS	R25D
Welding	AS	R26A
Inside Machine shop	AS	R31A
Engraving shop	AS	R31B
Diesel shop	AS	R31C
Valve shop	AS	R31D
Engine and Governor shop	AS	R31E
Hydraulics shop	AS	R31F
Optical shop	AS	R35A
Print shop	AS	R37A
Outside Machine shop	AS	R38A
Nuc Repair	AS	R38N
Photo/Repair Admin/Print	AS	R39A
Elect Repair/Motor Rewind	AS	R51A
Outside Electrical shop	AS	R51B
IC Shop	AS	R51G
Pipe shop/Powder Coat shop	AS	R56A

STANDARD WORK CENTER CODES FOR SUBMARINE FORCE SURFACE SHIPS (Cont'd)

Description	Used by Ship Type	Code
AC&R shop	AS	R56B
Flex Hose shop	AS	R56C
Insulation Lagging/Canvas shop	AS	R57A
Rubber and Plastics	AS	R57B
Woodworking shop	AS	R64A
Key and lock shop	AS	R64E
General Electronics/Computer Repair	AS	R67A
Calibration	AS	R67B
Mast & Antenna shop	AS	R67H
2M Repair	AS	R67M
Rigging services	AS	R72A
Dive Locker	AS	R72B
Dive Locker (fly away team)	AS	R72F
Sail and Canvas	AS	R74A
Sound & analysis	AS	R92A
NDT/QA	AS	R93A
QA	AS	R93B
Radiological Controls	AS	R94A
MIRCS Lab	AS	R96A

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APPENDIX C_3C

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		
COMSUBRON ELEVEN	PQ		
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 C_3D

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 C_4

STANDARD WORK CENTER CODES FOR NAVAL SURFACE FORCE SHIPS

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APPENDIX C_4A

STANDARD WORK CENTER CODES FOR LPD-4 CLASS SHIPS

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
EXECUTIVE DEPARTMENT			
	EX		
	PERSONNEL	EX01	ALL
	ADMIN	EX02	Can Be Combined With EX01
	3MC	EX03	ALL MDS ONLY
	MAA	EX04	ALL
	OFF SHIP SERVICES	ES01	ALL Contains All X Service XRICS MDS ONLY
MEDICAL DEPARTMENT			
	MH		
	MEDICAL	MH01	ALL
DENTAL DEPARTMENT			
	MD		
	DENTAL	MD01	AS REQUIRED
SUPPLY DEPARTMENT			
	S1		
	STOCK CONTROL	SS01	ALL
	HAZMAT/ENVIRONMENTAL	HE01	ALL
	AVIATION STORES	SS06	AS REQUIRED
	S2		
	FOOD SERVICE	SS02	ALL
	WARD ROOM	SS05	AS REQUIRED
	S3		
	SHIP SERVICES	SS03	ALL
STOCK DEPARTMENT			
	STOK		
	STOCK	STK	ALL MDS ONLY
DECK DEPARTMENT			
	DA		
	DECK	DA01	ALL
	BOATS	DA02	AS REQUIRED
	DB		
	SECOND	DB01	ALL
		DB02	AS REQUIRED
		DB03	AS REQUIRED

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
ENGINEERING DEPARTMENT			
	EA		
	AUXILIARY EN	EA01	ALL
	ENGINE SHOP	EA02	AS REQUIRED
	HYDRAULICS	EA04	ALL
	AC&R	EA05	ALL
	EE		
	ELEC TOOL ISSUE/SAFETY	EE01	ALL
	ELECTRICAL SHOP	EE02	ALL
	INTERIOR COMMS	EE03	ALL
	SITE TELEVISION	EE04	AS REQUIRED
	EM		
	MAIN MACHINERY RM 1	EM01	ALL
	MAIN MACHINERY RM 2	EM02	ALL
	AUX MACHINERY RM 1	EM03	ALL
	AUX MACHINERY RM 2	EM04	ALL
	OIL LAB	EB14	ALL
	GAGE CAL	FCA1	ALL
	ER		
	HULL REPAIR	ER01	ALL
	MACHINERY REPAIR	ER03	ALL
	DAMAGE CONTROL	ER04	ALL
	DCPO	ER09	ALL
	ENGINEERING ADMIN	EX00	AS REQUIRED
AIR DEPARTMENT			
	V1		
	FLIGHT DECK	V101	ALL
	AVIATION FUELS	V401	ALL
	GROUND SUPPORT EQUIPMENT	VM04	ALL
OPERATIONS DEPARTMENT			
	OC		
	RADIO	OC01	ALL
	LAN/ADP	OC02	ALL
	OE		
	ELECTRONICS	OE01	ALL
	RADARS	OE05	ALL
	2-M REPAIR	OE03	ALL
	TEST EQUIPT ELEC CAL	OE04	ALL
	OI		
	CIC	OI01	ALL
	NAVIGATION	OI02	ALL
	ELECTRONIC WARFARE	OT01	ALL
	OW		
	GUNNERY/ARMORY	OW03	ALL
	FORCE PROTECTION CIWS	OW04	ALL

APPENDIX C_4B

STANDARD WORK CENTER CODES FOR PC CLASS SHIPS

DEPARTMENT	DIVISION W/C	W/C CODE	CLASS
EXECUTIVE DEPARTMENT			
	EX		
	OFF SHIP SERVICES	XS01	ALL
	MEDICAL	MH01	ALL
	3MC	XX03	
ENGINEERING DEPARTMENT			
	EN		
	ELECTRICAL SHOP	EE02	ALL
	MER FWD	EM01	ALL
	MER AFT	EM02	ALL
	DCPO	ER09	ALL
OPERATIONS DEPARTMENT			
	OP		
	RADIO	IS01	ALL
	ARMORY/FORCE PROTECTION	CG03	ALL
	NAVIGATION	OI02	ALL
	DECK	OD01	ALL
	CIC	OI01	ALL

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APPENDIX C_4C

STANDARD WORK CENTER CODES FOR MCM CLASS SHIPS

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
ENGINEERING DEPARTMENT			
	EE		
	ELECTRICAL SHOP	EE02	ALL
	EM		
	AUXILIARY	EA01	ALL
	MER	EM01	ALL
	AMR	EM02	ALL
	OIL LAB	EB14	ALL
	FLEET CAL ACTIVITY	FCA1	ALL
	ER		
	HULL REPAIR	ER01	ALL
	DAMAGE CONTROL	ER04	ALL
	DCPO	ER09	ALL
EXEC DEPARTMENT			
	EX		
	MEDICAL	EH01	ALL
	ADMIN	EX01	ALL
	3MC	EX03	ALL MDS ONLY
	OFF SHIP SERVICES	ES01	ALL Contains All X-Services XRICS MDS ONLY
OPERATIONS DEPARTMENT			
	OE		
	INTERIOR COMMS	OE02	ALL
	RADIO	OC01	ALL
	ELECTRONICS	OE01	ALL
	OI		
	CIC/MINE COUNT MEAS	OI01	ALL
	NAVIGATION	OI02	ALL
	OD		
	DECK	OD01	ALL
	ARMORY/FORCE PROTECTION	OD02	ALL
SUPPLY DEPARTMENT			
	S1		
	GENERAL STORES	SS01	ALL
	FOOD SERVICE	SS02	ALL
	HAZ/ENV	HE01	ALL

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
STOCK DEPARTMENT			
	STOK STOCK	STK	ALL

APPENDIX C_4D

STANDARD WORK CENTER CODES FOR LSD CLASS SHIPS

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
DECK DEPARTMENT			
	DA		
	DECK BOATS	DA01	ALL
		DA02	AS REQUIRED
		DA03	AS REQUIRED
	DB		
		DB01	ALL
		DB02	AS REQUIRED
		DB03	AS REQUIRED
ENGINEERING DEPARTMENT			
	EA		
	ENGINE/BOAT SHOP	EA02	ALL
	HYDRAULICS	EA04	ALL
	AC&R	EA05	ALL
	EE		
	ELEC TOOL ISSUE/SAF	EE01	ALL
	ELECTRIC SHOP	EE02	ALL
	EM		
	MAIN MACHINERY RM 1	EM01	ALL
	MAIN MACHINERY RM 2	EM02	ALL
	AMR FWD	EM03	AS REQUIRED
	AMR AFT	EM04	AS REQUIRED
	OIL LAB	EB14	ALL
	GAGE CAL	FCA1	ALL
	ER		
	HULL REPAIR	ER01	ALL
	MACHINE SHOP	ER03	ALL
	DAMAGE CONTROL	ER04	ALL
	DCPO	ER09	ALL
EXECUTIVE DEPARTMENT			
	EX		
	ADMIN	EX01	ALL
	3MC	EX03	ALL MDS ONLY
	OFF SHIP SERVICES	ES01	Contains All X-Services XRICS MDS ONLY
	MAA	EX04	ALL
MEDICAL DEPARTMENT			
	MH		
	MEDICAL	MH01	ALL

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
DENTAL DEPARTMENT			
	DA		
	DENTAL	DH01	ALL
OPERATIONS DEPARTMENT			
	OC		
	RADIO	OC01	ALL
	LAN/ADP	OC02	ALL
	OE		
	IC SHOP	OE06	ALL
	ELECTRONICS	OE01	ALL
	2-M REPAIR	OE03	ALL
	TEST EQUIPT ELEC CAL	OE04	ALL
	RADARS	OE05	ALL
	OI		
	CIC	OI01	ALL
	ELECTRONIC WARFARE	OT01	AS REQUIRED
	OW		
	GWS FIRE CONTROL	OW02	ALL
	ARMORY/FORCE PROTECTION	OW03	ALL
	CIWS	OW04	ALL
NAVIGATION			
	NN		
	NAVIGATION	NN01	ALL
SUPPLY DEPARTMENT			
	S1		
	STOCK CONTROL	SS01	ALL
	HAZ/ENV	HE01	ALL
	S2		
	FOOD SERVICE	SS02	ALL
	S3		
	SHIP SERVICES	SS03	ALL
STOCK DEPARTMENT			
	STOK		
	STOCK	STK	ALL

APPENDIX C_4E

STANDARD WORK CENTER CODES FOR LHA/LHD CLASS SHIPS

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
AIMD DEPARTMENT			
	IM		
	PRODUCTION/ QA/SUPPLY/TRAINING	IM01	ALL
	PWR PLANTS/AIRFRAMES	IM02	ALL
	AVIATION LIFE SUPPORT ARMAMENT SUPPORT EQUIP/ CALIBRATION LAB	IM03	ALL
	AVIATION SUPPORT EQUIPMENT	IM04	ALL
AIR DEPARTMENT			
	V1		
	FLIGHT DECK	V101	ALL
	CRASH AND SALVAGE	V102	ALL
	V3		
	HANGER DECK	V301	ALL
	V4		
	FLIGHT DECK FUELS	V401	ALL
	BELOW DECK FUEL	V402	ALL
CHAPLAIN DEPARTMENT			
	CH		
	CHAP	CH01	Req'd If Chaplain Assigned
COMBAT CARGO DEPARTMENT			
	CD	CCD1	MDS ONLY
COMBAT SYSTEMS DEPARTMENT			
	CE		
	RADAR REPAIR	CE01	ALL
	COMMUNICATION REPAIR	CE02	ALL
	2-M REPAIR	CE03	ALL
	TEST EQUIP ELEC CAL	CE04	ALL
	IC SHOP	CE05	ALL
	INTERIOR COMM	CE06	ALL
	CCTV	CE07	ALL
	CF		
	ACDS	CSF1	ALL
	RADARS	CSF2	ALL
	CIWS	CSF3	ALL
	MISSILES (RAM, TAS)	CSF4	ALL
	CC		

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
	RADIO	CC01	ALL
	LAN/ADP	CC02	ALL
	COMPUTER REPAIR	CC03	ALL
DECK DEPARTMENT			
	DA		
	FORWARD GEAR	DA01	ALL
	DB		
	AFT GEAR	DB01	ALL
DENTAL DEPARTMENT			
	MD		
	DENTAL	MD01	Req'd If Dentist Assigned
ENGINEERING DEPARTMENT			
	EA		
	AUX MACHINERY ROOM	EA01	As Required
	ENGINE SHOP	EA02	ALL
	STEAM SHOP (HOTEL SRV)	EA03	ALL
	AC&R	EA05	ALL
	AS		
	HYDRAULICS	AS01	ALL
	ASSAULT SHOP	AS02	ALL
	EE		
	ELEC TOOL ISSUE/SAFETY	EE01	ALL
	ELECTRIC SHOP	EE02	ALL
	POWER AND REWIND	EE03	ALL
	DISTRIBUTION	EE04	ALL
	EM		
	MAIN MACHINERY ROOM 1	EM01	ALL
	MAIN MACHINERY ROOM 2	EM02	ALL
	BOILER/ELECT CONTROL	EM03	ALL
	OIL LAB	EB14	ALL
	ER		
	HULL REPAIR	ER01	ALL
	MACHINE SHOP	ER03	ALL
	DAMAGE CONTROL REPR	ER04	ALL
	DCPO	ER09	ALL
EXECUTIVE DEPARTMENT			
	EX		
	ADMIN	EX01	ALL
	3MC	EX03	ALL
	MAA	EX04	ALL
	TRAINING	ET01	MDS ONLY
	OFF SHIP SERVICES	ES01	X-SERVICE XRICS MDS ONLY

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
	MASS COMMUNICATION SPECIALIST	VI01	ALL
MEDICAL DEPARTMENT			
	MH		
	MEDICAL	MH01	ALL
NAVIGATION DEPARTMENT			
	NN		
	NAVIGATION	NN01	ALL
OPERATIONS DEPARTMENT			
	OC		
	AIR TRAFFIC CONTROL	OC01	ALL
	OI		
	CIC	OI01	ALL
	OT		
	ELECTRONIC WARFARE	OT01	ALL
	CRYPTOLOGIC WARFARE	OT02	As Required
	OZ		
	JOINT INFORMATION CENTER	OZ01	ALL
SAFETY DEPARTMENT			
	SA		
	SAFETY	SA01	ALL
SUPPLY DEPARTMENT			
	S1		
	STOCK CONTROL	SS01	ALL
	S2		
	FOOD SERVICE	SS02	ALL
	S3		
	SHIP SERVICES	SS03	ALL
	S5		
	WARD ROOM	SS05	ALL
	S6		
	AVIATION STORES	SS06	ALL
	S8		
	GENERAL STORES	SS08	ALL
	HAZMAT/ENVIRONMENTAL	HE01	ALL
WEAPONS DEPARTMENT			
	G1		
	AVIATION ARMS	WG01	ALL
	G2		
	ARMORY/FORCE PROTECTION	WG02	ALL

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
	G3		
	CARGO HANDLING MAG	WG03	ALL
	G4		
	AMM0 ADMIN	WG04	ALL

APPENDIX C_4F

STANDARD WORK CENTER CODES FOR ARS CLASS SHIPS

DEPARTMENT	DIVISION W/C	W/C CODE	CLASS
EXECUTIVE DEPARTMENT			
	OFF SHIP SERVICES CONTAINS ALL X-SERVICES XRICS	XS01	ALL
	MEDICAL	MH01	ALL
	ADMIN	XX01	ALL
	3MC	XX03	ALL
SUPPLY DEPARTMENT			
	GENERAL STORES SKss	SS01	ALL
	FOOD SERVICE CSs	SS02	ALL
	SHIP SERVICES SHs	SS03	ALL
	POSTAL/DISBURSING PC/DK	SS04	ALL
	DISBURSING DK	SS07	AS REQUIRED TO SPLIT DK AND PCs
	HAZMAT	HZ01	ALL
	STK SKs	STK	ALL
ENGINEERING DEPARTMENT			
	AUXILIARY ENs	EA01	ALL
	INTERIOR COMMS IC	IC01	ALL
	ELECTRICAL SHOP	EE02	ALL
	MER	EM01	ALL
	AMR	EM02	ALL
	OIL LAB	EB14	ALL
	FLEET CAL ACTIVITY	FCA1	ALL
	HULL REPAIR HTs	ER01	ALL
	DAMAGE CONTROL	ER04	ALL
	DCPO	ER09	ALL
OPERATIONS DEPARTMENT			
	RADIO	IS01	ALL
	LAN/ADP	IS02	ALL
	CIC	OI01	ALL
	NAVIGATION OSs	OI02	ALL

WORK CENTER NAME	DIVISION W/C	W/C CODE	CLASS
COMBAT SYSTEMS DEPARTMENT/ WEAPONS DEPARTMENT			
	ELECTRONICS	CSE1	ALL
	2M REPAIR	CSE3	ALL
	INTERIOR COMMS IC	IC01	ALL
	GUNNERY/ARMORY	CG03	ALL
	FORCE PROTECTION	FP01	ALL
DECK DEPARTMENT			
	DECK	DA01	ALL
	DIVING AND SALVAGE	DB01	ALL

APPENDIX C_4G

STANDARD WORK CENTER CODES FOR CG/DDG/FFG CLASS SHIPS

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
COMBAT SYSTEMS			
	CC		
	RADIO	CC01	ALL
	LAN/ADP	CC02	ALL
	CF		
	SPY	CF01	CG, DDG
	ACNT/DISPLAY	CF02	ALL
	FCS/ORTS	CF03	ALL
	CE		
	INTERIOR COMMS	CE01	ALL
	RADAR/NAV	CE03	ALL
	TEST EQUIPT ELEC CAL	CE04	ALL
	ELECTRONICS	CSE1	ALL
	2M REPAIR	CSE3	ALL
	CA		
	SPS-53/V-10/MAIN SONAR	CA01	ALL
	TOWED ARRAY	CA02	AS APPLICABLE
	MINE COUNTERMEASURE	CA04	AS APPLICABLE
	CG		
	GUNS	CG01	CG, DDG
	GWS	CG02	CG, DDG
	ARMORY/TORPEDO/FORCE PROTECTION	CG03	ALL
	CIWS	CG04	AS APPLICABLE
	CM		
	TOMAHAWK	CM01	CG, DDG
	VLS	CM02	CG, DDG
	SPARROW/HARPOON/MISSLE	CM03	AS APPLICABLE
ENGINEERING DEPARTMENT			
	EA		
	AUXILIARY	EA01	ALL
	DIESEL	EA02	FFG
	RAST	EA04	AS APPLICABLE
	EE		
	ELEC TOOL ISSUE/SAFETY	EE01	ALL
	ELECTRICAL SHOP	EE02	ALL
	EM		
	MER 1	EM01	ALL
	MER 2	EM02	CG, DDG
	3 GTG	EM03	DDG
	PROPULSION ELECTRICAL	EM04	ALL
	OIL LAB	EB14	ALL

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
	FLEET CAL ACTIVITY	FCA1	ALL
	ER		
	HULL REPAIR	ER01	ALL
	MACHINERY REPAIR	ER03	CG, DDG
	DAMAGE CONTROL	ER04	ALL
	DCPO	ER09	ALL
EXECUTIVE DEPARTMENT			
	EX		
	ADMIN	EX01	ALL
	3MC	EX03	ALL MDS ONLY
	OFF SHIP SERVICES	ES01	ALL MDS ONLY
	MAA	EX04	ALL
HEALTH SERVICES DEPARTMENT			
	HM		
	MEDICAL	HM01	ALL
OPERATIONS DEPARTMENT			
	OD		
	DECK	OD01	ALL
	OT		
	ELECTRONIC WARFARE	OT01	ALL
	CRYPTOLOGIC WARFARE	OT02	REQUIRED FOR PCMS
	OI		
	CIC	OI01	ALL
NAVIGATION DEPARTMENT			
	NN		
	NAVIGATION	NN01	ALL
SUPPLY DEPARTMENT			
	S1		
	GENERAL STORES	SS01	ALL
	HAZMAT/ENVIRONMENT	HE01	ALL
	S2		
	FOOD SERVICE	SS02	ALL
	S3		
	SHIP SERVICES	SS03 STK	ALL
STOCK DEPARTMENT			
	STOK		
	STOCK	STK	RSUPPLY ONLY

APPENDIX C_4H

STANDARD WORK CENTER CODES FOR LCS CLASS SHIPS

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
COMBAT SYSTEMS DEPARTMENT			
	CG		
	GUNNERY/ARMORY GRP	CG03	ALL
	FORCE PROTECTION	FP01	ALL
	CS		
	ELECT/COMMS/LAN GRP	CSE1	ALL
	ELECT/ELECT ISSUE	CE04	ALL
ENGINEERING DEPARTMENT			
	EA		
	MECHANICAL GROUP	EA01	ALL
	EE		
	ELECTRICAL GROUP	EE02	ALL
	ER		
	REPAIR/DC/DCPO GROUP	ER09	ALL
EXECUTIVE DEPARTMENT			
	EX		
	3MC	XX03	ALL (NO PMS)
	OFF SHIP SERVICES	XS01	ALL (NO PMS)
OPERATIONS DEPARTMENT			
	OI		
	CIC/NAVIGATION GROUP	OI01	ALL
	OD		
	DECK GROUP	OD01	ALL
SUPPLY DEPARTMENT			
	S1		
	SUPPLY GROUP	SS01	ALL
	HAZMAT/ENVIRONMENTAL	HZ01	ALL
	MEDICAL	MH01	ALL

LCS MISSION MODULES - 4 DEPARTMENTS

The work center assignments will be as follows: (This will be based on the number and LCS hull number the module is assigned.)

SHORE DEPARTMENT SH01 to SH99

Note 1: The shore department receives all of the material and tracks the maintenance of the gear while at the MPSF. All initial assignments of equipment and equipage will be work center SH01. The SH01 will be the secondary work center on all configuration records to allow for the ordering of parts while the module is deployed.

ASW DEPARTMENT AS01 to AS99
Note 2: For all ASW based Mission Modules

SUW DEPARTMENT SU01 to SU99
Note 3: For all SUW based Mission Modules

MCM DEPARTMENT MC01 to MC99
Note 4: For all MCM based Mission Modules

Each of the departmental structures will be broken down into work centers, using the first 2 letters of the department. There is one work center for each Mission Module. There can be a maximum of 99 work centers under each department.

To place the gear in a different department or work center, just change the work center assignment for the record. Upline reporting informs CDMD-OA of the change, or communication with the CDM so they can do bulk changes.

Include the PMS team at NSLC when making the changes to keep PMS data updated.

The MPSF will receive and serialize the equipage then assign to the correct mission module.

APPENDIX C_4I

STANDARD WORK CENTER CODES FOR LCC 19 CLASS SHIPS

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
INFORMATION SYSTEM DEPARTMENT			
	CE		
	SATELLITE COMM	CE01	
	LINE OF SIGHT COMMS	CE02	
	RADAR	CE03	
	2-M	CSE3	
	TEST EQUIPT ELEC CAL	CE04	
	CSI		
	INTERIOR COMM	CSI1	
	CR		
	RADIO	CR01	
	CI		
	LAN AND LAN HARDWARE	CI01	
DECK DEPARTMENT			
	DA		
	ANCHOR/MOORING STA	DA01	
	SPONSON/BOATS	DA02	
	DB		
	MAIN DECK	DB01	
ENGINEERING DEPARTMENT			
	EA		
	AUXILIARY	EA01	
	ENGINE/BOAT SHOP	EA02	
	AC&R	EA05	
	EE		
	ELECTRICAL SHOP	EE01	
	ELEC TOOL ISSUE/SAF	EE02	
	EM		
	ENGINE ROOM	EM01	
	FIRE ROOM	EM02	
	EABC LAB	EM03	
	OIL LAB	EM04	
	GAGE CAL	EM05	
	ER		
	HULL REPAIR	ER01	
	MACHINE SHOP	ER03	
	DAMAGE CONTROL REP	ER04	
	DCPO	ER09	
EXECUTIVE DEPARTMENT			
	EX		
	ADMIN	EX01	
	3MC	EX03	MDS ONLY
	OFF SHIP SERVICES	ES01	MDS ONLY
	MAA/LNS	EX04	

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
	VI		
	MCS	VI01	
CHAPLAIN DEPARTMENT			
	CH		
	CHAP	CHA1	IF CHAPLAIN ASSIGNED
MEDICAL DEPARTMENT			
	MH		
	MEDICAL	MH01	
DENTAL DEPARTMENT			
	MD		
	DENTAL	MD01	IF DENTIST IS ASSIGNED
OPERATION DEPARTMENT			
	OI		
	CIC	OI01	
	ELECTRONIC WARFARE	OI03	
	ON		
	NAVIGATION	ON01	
	OW		
	GUNNERY MAINTENANCE	OW01	
	SHIPS ARMORY	OW03	
	CIWS	OW04	
SUPPLY DEPARTMENT			
	S1		
	STOCK CONTROL/POSTAL	SS01	
	HAZ/ENV	HE01	
	S2		
	FOOD SERVICE	SS02	
	S3		
	SHIPS SERVICE	SS03	
	S5		
	WARD ROOM	SS05	
	FLAG MES	FS05	
	STOK		
	STOCK	STK	

APPENDIX C_4J

STANDARD WORK CENTER CODES FOR LPD 17 CLASS SHIPS

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
AIR DEPARTMENT			
	V1		
	FLIGHT DECK (ABH)	V101	ALL
	AVIATION FUELS	V401	ALL
	GROUND SUPPORT EQUIP	VM04	ALL
CHAPLAIN DEPARTMENT			
	CH		
	CHAP	CH01	ALL
COMBAT CARGO DEPARTMENT			
	CD		
	CCAD	CCD1	MDS ONLY
COMBAT SYSTEMS DEPARTMENT			
	CC		
	RADIO	CC01	ALL
	LAN/ADP	CC02	ALL
	CE		
	TEST EQUIPT ELEC CAL	CE04	ALL
	RADAR REPAIR/NAV	CSE1	ALL
	COMMUNICATION REPAIR	CSE2	ALL
	2-M REPAIR/STO	CSE3	ALL
	COMPUTER REPAIR	CSE4	ALL
	CM		
	ACDS/SSDS	CM01	ALL
	RADARS	CM02	ALL
	MISSILES (RAM, TAS)	CM04	ALL
	CG		
	GWS	CG02	ALL
	ARMORY/FORCE PROTECTION	CG03	ALL
	CARGO/AVIATION MAGZN	CG04	ALL
DECK DEPARTMENT			
	DA		
	FIRST	DA01	ALL
	BOATS	DA02	AS REQUIRED
		DA03	AS REQUIRED
	DB		
	SECOND	DB01	ALL
		DB02	AS REQUIRED
		DB03	AS REQUIRED

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
ENGINEERING DEPARTMENT			
	EA		
	AUXILIARY	EA01	ALL
	ENGINE SHOP	EA02	AS REQUIRED
	HYDRAULICS	EA04	ALL
	AC&R	EA05	ALL
	EE		
	ELEC TOOL ISSUE/SAF	EE01	ALL
	ELECTRICAL SHOP	EE02	ALL
	POWER AND REWIND	EE03	AS REQUIRED
	IC SHOP	EE04	ALL
	INTERIOR COMM	EE05	AS REQUIRED
	CCTV	EE06	ALL
	EM		
	MAIN MACHINERY RM 1	EM01	ALL
	MAIN MACHINERY RM 2	EM02	ALL
	AUX MACHINERY RM 1	EM03	ALL
	AUX MACHINERY RM 2	EM04	ALL
	AUX MACHINERY RM 3	EM05	ALL
	OIL LAB	EB14	ALL
	GAGE CAL	FCA1	ALL
	ER		
	HULL REPAIR	ER01	ALL
	MACHINERY REPAIR	ER03	ALL
	DAMAGE CONTROL REP	ER04	ALL
	DCPO	ER09	ALL
EXECUTIVE DEPARTMENT			
	EX		
	ADMIN	EX01	ALL
	3MC	EX03	ALL MDS ONLY
	MAA	EX04	ALL
	TRAINING	ET01	ALL MDS ONLY
	OFF SHIP SERVICES	ES01	All Contains All X-Services XRICS
HEALTH SERVICES DEPARTMENT			
	HM		
	MEDICAL	HM01	ALL
	HD		
	DENTAL	HD01	ALL
OPERATIONS DEPARTMENT			
	OI		
	CIC	OI01	ALL
	ON		
	NAVIGATION	ON01	ALL
	OT		

DEPARTMENT	DIVISION W/C	SHIP CODE	CLASS
	ELECTRONIC WARFARE	OT01	ALL
	CRYPTO WARFR (PCMS)	OT02	ALL
SUPPLY DEPARTMENT			
	S1		
	STOCK CONTROL	SS01	ALL
	HAZ/ENV	HE01	
	AVIATION STORE	SS06	AS REQUIRED
	S2		
	FOOD SERVICE	SS02	ALL
	WARD ROOM	SS05	AS REQUIRED
	S3		
	SHIP SERVICES	SS03	ALL
STOCK DEPARTMENT			
	STOK		
	STOCK	STK	ALL MDS ONLY

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APPENDIX D

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
NAVSEA/TYCOM Issued Alterations	EXSA
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 E

JOB ORIGINATOR VALUES

Code	Short Description
A	HM&E RA (SUB/AIR)
B	C5RA (AIR) - Local TYCOM
C	C5RA (National)
D	C5RA (AIR) - Local TYCOM
G	RMC Inputs (AIR) - Local TYCOM
H	RMC Inputs (AIR) - Local TYCOM
J	ICAS (National)
K	C5RA (SURF) - Local TYCOM
P	PMT OSAR (SUB) - Local TYCOM
Q	Created by RMAIS (National)
R	INSURV (National)
S	Sail Deficiencies (SUB) - Local TYCOM
W	Class Maintenance Plans (AIR, SUB)
X	Class Maintenance Plans (AIR, SUB)
Y	MST (SURF) Class Maintenance Plans (AIR) - Local TYCOM
Z	MST (SURF), CMP (National) - Z-alpha (National), Z-numeric (MST)

References to “National” values indicate that, in accordance with SHIPMAIN direction, an Information Technology product has been identified as the only authorized tool that will create 4790-2-Kilos containing the respective Job Originator code.

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APPENDIX F

SAMPLE SITUATIONAL REQUIREMENT REFERENCE SHEET

PERIODICITY	SITUATION	MR DESCRIPTION
D-1R W-3R M-1R	(Prior to getting underway)	(Lubricate)
Q-6R A-5R	(Accomplish at sea prior to submergence)	(Test Operate)
R-1W		

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VOLUME VI

CHAPTER 20

WEIGHT AND MOMENT CONTROL FOR SUBMARINES

REFERENCES.

(a) NAVSEA S9086-C6-STM-010 - NSTM Chapter 096 (Weights and Stability)
(b) NAVSEAINST C9096.2 - Weight and Stability Requirements for Active Submarines
(c) NAVSEA S9SSN-W4-SSM-PA0/C688CLV7 - SSN688 Class Ship Systems Manual, Vol 7, Chapter 2, Section 2.3

LISTING OF APPENDICES.

A Sample Ship Message to ISIC Concerning Removal or Reinstallation of DDS Lead
B Sample Ship Message to ISIC Concerning Audit of DDS Lead Loading
C Sample Ship Message to ISIC Concerning Audit of Cargo Lead Documentation

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 solid ballast is important for submarine stability and the ability to maintain submerged equilibrium for all design conditions. Ballast lead typically, is installed in submarines for the following purposes:

(1) To maintain adequate stability.

(2) To correct for inherent transverse moments that would otherwise create list.

(3) To permit submarines to submerge with neutral buoyancy and zero trim for all design equilibrium conditions.

(4) To compensate for future installed alterations.

b. An inclining experiment and all-stop trim dive are performed in accordance with the requirements of reference (a). These experiments provides the basic data concerning weight and center of gravity for use in all considerations of stability, reserve buoyancy, equilibrium 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 vertical center of gravity of the submarine. The trim dive is the only satisfactory method of determining the load to submerge and the final ballasting solution. Inclining experiments are conducted on each submarine in new construction, after the Post Shakedown Availability and when authorized by Naval Sea Systems Command (NAVSEA) for some overhaul availabilities. Trim dives are performed during delivery sea trials, prior to and after Post Shakedown Availability, prior to and after major availabilities and under specific circumstances to address ballasting issues reported by Ship's Force. Trim dives are also performed periodically prior to smaller availabilities to identify weight growth.

c. Initial ship design provides for adequate stability and equilibrium for all expected loading conditions. Service life margin, in the form of permanent lead ballast in excess of that needed to maintain stability and equilibrium, allows for growth, but historically the margin is quickly consumed for several reasons:

(1) The on-going process of modernization over the life of the ship.

(2) Unknown weight growth due to the accumulation of personal gear and equipment, undocumented alterations, spare parts and stores.

(3) Weight removal or margin recovery measures being accorded a low priority.

20.2 BALLAST CHANGES. NAVSEA maintains a record of the solid ballast installed in each submarine. These records are required for evaluating and tracking the ship's stability and equilibrium. Any permanent alteration to a submarine that changes weight, moment or displacement may require compensation by the removal or installation of lead ballast.

20.2.1 Naval Sea Systems Command Notification. Any activity performing this alteration is required by reference (b) to submit a reballasting proposal to NAVSEA for approval. NAVSEA approval is required for all permanent ballast changes. Copies of the reballasting proposal shall be sent to the Type Commander (TYCOM), Immediate Superior In Command (ISIC) and the Commanding Officer.

20.2.2 Ballast Types. Submarines of the active fleet shall be maintained within stability and buoyancy limits for a state of war readiness. Deviations from this principle are generally unauthorized. Some ships are authorized to carry other types of lead ballast as follows:

a. Dry-Deck Shelter (DDS) Capable SSN: Some of these SSN ships have special lead called DDS lead that can be removed when the shelter is installed and re-loaded after the shelter is removed.

(1) After each Depot Maintenance Period, a Weight and Stability Data Report is developed by the Shipyard performing the availability. This document provides the amount, location and moment calculations for the removable DDS lead. The document provides the amount of DDS lead to be removed for DDS on-load and operations based on a specific set of loading parameters. The latest copy of this data package is to be maintained by Ship's Force.

(2) The amount of DDS lead either removed or reinstalled will be reported using the message format shown in Appendix A following an on-load or off-load of the DDS shelter prior to at sea operations.

(3) Each ship is responsible to determine the amount of DDS lead to remove (if any) based on their expected mission loading to maintain conditions within the equilibrium polygon. It is the responsibility of the ISIC to ensure Ship's Force is trained on the handling of DDS lead. Details on the DDS lead, including handling procedures, can be found in reference (c).

(4) In the event the DDS is on-loaded in a port other than the homeport, the ISIC is responsible for ensuring the DDS lead is transported to the port where the DDS will be removed so that the lead is available for Ship's Force loading concurrent with the DDS off-load.

(5) When the DDS capable ship is operating without the DDS, all DDS lead is considered part of the ship's permanent lead ballast and shall be installed in the designated locations as specified in the Weight and Stability Data Report.

(6) Actual DDS lead loading shall be audited by Ship's Force prior to each Dry-Docking Selected Restricted Availability (DSRA), Depot Modernization Period (DMP), Engineered Overhaul, or Pre-Inactivation Restricted Availability (PIRA) to ensure the DDS lead is properly installed. The ISIC is responsible for ensuring that Ship's Force is using the latest shipyard Weight and Stability Data Report for validating the DDS lead loading. A report of the audit findings will be made using the message format shown in Appendix B. If a particular tank is scheduled for re-preservation and the work is listed in the Availability Work Package, the audit of the DDS lead in that specific tank may be delayed until the lead is reinstalled following preservation. Any audit conducted during the availability must be completed and reported prior to Dock Trials.

b. Cargo Lead: Ships have cargo lead loaded at various times to compensate for loads or loading configurations. This cargo lead can become undocumented weight over time due to crew turnover and loss of corporate knowledge. To that end the following is required for loading and off-loading of cargo lead:

(1) Cargo ballast, unless part of the original design, is approved by NAVSEA on a ship by ship basis. Requests for cargo ballast, and requests for increased amount of cargo ballast, must be submitted by the ship, in writing, to NAVSEA for approval. All such requests shall have TYCOM endorsement.

(2) Changes to cargo lead which includes adding, removing or relocating shall normally be accomplished only by a nuclear qualified shipyard. Approval by the ISIC and TYCOM is required in the event a situation requires an organization other than a nuclear qualified shipyard to add, remove or relocate cargo lead.

(a) All requests for cargo lead changes will include the specific weight amount, location, and method for securing the lead.

(b) Cargo lead documentation shall be audited by Ship's Force during each Maintenance and Modernization Program, DSRA, DMP, Engineered Overhaul, or PIRA to ensure the cargo lead is being properly tracked. The ISIC is responsible for ensuring that Ship's Force is using the latest shipyard documentation for the cargo lead. A report of the audit findings will be made using the format of Appendix C.

(3) Any cargo lead load that results in a calculated mission equilibrium point outside the equilibrium polygon requires a NAVSEA approved Departure From Specifications (DFS). Additional guidance and procedures concerning the installation or removal of cargo ballast is available in reference (b).

c. Permanent Ballast: Changes in permanent ballast, which includes adding, removing or relocating, shall not be accomplished by Ship's Force, Fleet Maintenance Activities or any industrial activity without prior TYCOM concurrence and NAVSEA written approval.

d. Sea Trial Lead. Temporary ballast may be added as necessary to assure that the ship is capable of diving and trimming out when lightly loaded during sea trials following a Chief of Naval Operations availability (DMP, DSRA, PIRA, etc.). NAVSEA shall review and approve temporary ballast used for trials. The TYCOM shall approve the use of any temporary lead retained or added after sea trials for transit to homeport. All temporary lead ballast must be removed prior to load-out and deployment. A temporary DFS shall be opened upon installation of temporary sea trial ballast and closed upon removal of that ballast. The forwarding letter for the post-availability stability report shall reference the DFS and provide the current status of the temporary lead ballast.

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. Ship's Force will 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.

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APPENDIX A

SAMPLE SHIP MESSAGE TO ISIC CONCERNING REMOVAL OR REINSTALLATION OF DDS LEAD

FM USS <SHIP NAME>//
TO COMSUB<RON/GRU NO.>//
COMSUBRON <NO. HOME SQUADRON IF DEPLOYED>
INFO COMSUB<LANT/PAC> <NORFOLK VA/PEARL HARBOR HI>//
BT
UNCLAS //N9096//
MSGID/GENADMIN//USS <SHIP'S NAME>//
SUBJ/(SUBS) USS <SHIP NAME/HULL NO.>REMOVAL <REINSTALLATION> OF DDS LEAD//
REF/A/DOC/COMUSFLTFORCOM/<DATE>//
REF/ REF A IS COMUSFLTFORCOMINST 4790.3, JOINT FLEET MAINTENANCE MANUAL, VOLUME VI, CHAPTER 20.//
RMKS/1. DDS SHELTER <NUMBER> IS BEING ON-LOADED <OFF-LOADED>
2. PER REF A THE SPECIFIC DDS LEAD THAT HAS BEEN REMOVED <REINSTALLED> IS PROVIDED:

<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>
<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>
<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>
<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>
<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>

BT

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

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APPENDIX B

SAMPLE SHIP MESSAGE TO ISIC CONCERNING AUDIT OF DDS LEAD LOADING

FM USS <SHIP NAME>//
TO COMSUB<RON/GRU NO.>//
COMSUBRON <NO. HOME SQUADRON IF DEPLOYED>
INFO COMSUB<LANT/PAC> <NORFOLK VA/PEARL HARBOR HI>//
BT
UNCLAS //N9096//
MSGID/GENADMIN//USS <SHIP'S NAME>//
SUBJ/(SUBS) USS <SHIP NAME/HULL NO.>AUDIT OF DDS LEAD LOADING//
REF/A/DOC/COMUSFLTFORCOM/<DATE>//
REF/B/DOC/<SHIPYARD>/<DATE>
REF/ REF A IS COMUSFLTFORCOMINST 4790.3, JOINT FLEET MAINTENANCE MANUAL, VOLUME VI, CHAPTER 20. REF B IS THE WEIGHT AND STABILITY DATA REPORT FROM <SHIPYARD> DATED <DATE>.
RMKS/1. PER REF A THE CURRENT DDS LEAD LOADING AS REQUIRED BY REF B IS AS FOLLOWS:

<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>
<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>
<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>
<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>
<NUMBER> DDS PIGS - <NUMBER> APPROXIMATE WEIGHT - LOCATION <TANK AND LEAD BIN LOCATION>

BT

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

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APPENDIX C

SAMPLE SHIP MESSAGE TO ISIC CONCERNING AUDIT OF CARGO LEAD DOCUMENTATION

FM USS <SHIP NAME>//
TO COMSUB<RON/GRU NO.>//
INFO COMSUB<LANT/PAC> <NORFOLK VA/PEARL HARBOR HI>//
<SUPERVISING ACTIVITY/CODE NO>
COMNAVSEASYCOM WASHINGTON DC //
BT
UNCLAS //N9096//
MSGID/GENADMIN//USS <SHIP'S NAME>//
SUBJ/(SUBS) USS <SHIP NAME/HULL NO.> AUDIT OF INSTALLED CARGO LEAD
REF/A/DOC/COMUSFLTFORCOM/<DATE>//
REF/B/DOC/<ACTIVITY>/<DATE>//
REF/ REF A IS COMUSFLTFORCOMINST 4790.3, JOINT FLEET MAINTENANCE MANUAL, VOLUME VI, CHAPTER 20. REF B IS THE DATA PACKAGE BY THE <NAME> NAVAL SHIPYARD FOR THE INSTALLATION OF CARGO LEAD.//
RMKS/1. THE SHIP IS UNDERGOING <AVAILABILITY TYPE>. PER REF A AN AUDIT OF CARGO LEAD DOCUMENTATION HAS BEEN CONDUCTED. SHIP'S FORCE HAS REF B THAT DOCUMENTS THE CURRENT AMOUNT AND LOCATION OF CARGO LEAD.

BT

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

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VOLUME VI

CHAPTER 21

SUBMARINE STORAGE BATTERIES

REFERENCES.

(a) NAVSEA S9223-AF-MMO-010 - Submarine Main Storage Battery Technical Manual
(b) NAVSEA S9086-G1-STM-010 - NSTM Chapter 223, V1 (Submarine Storage Batteries - Lead Acid Batteries)

LISTING OF APPENDICES.

A Temperature Versus TVG Table
B Temperature Versus MCV Table
C TCV Calculation Table
D Capacity Test Discharge Data Sheet
E Main Storage Battery Inspection Check-Off
F Instructions for Completing Submarine Battery Quarterly Reports - NAVSEA 9320/3
G 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 flooded 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. This chapter does not apply to Valve Regulated Lead-Acid batteries. Although there are a wide variety of problems that can develop in batteries, previous experience has shown that there are specific causes of problems that can be eliminated.

a. Improper electrolyte agitation is the most frequent cause of problems with flooded submarine batteries. Airlift pump failure can cause 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's casualty.

21.2 ACTION.

a. All submarines with 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 references (a) and (b) 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) takes precedence over reference (b).

c. Naval Surface Warfare Center Crane, 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 parent Immediate Superior In Command (ISIC) by Naval Surface Warfare Center Crane, copy to the ship. The ISIC will endorse the report and forward to the ship for retention and completion of any recommended corrective actions. Ships will report to TYCOM N4 via ISIC the root causes for and the satisfactory completion of all corrective actions for deficiencies noted in the inspection report within 30 days of receipt of the report.

d. 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 hard copy of references (a) and (b) in the Maneuvering Area (or normal controlling station for battery charges).

(2) SSN 688, SSN 21, SSBN/SSGN 726, SSN 774 and later Class submarines shall operate the main storage battery and support system in accordance with the Ship's Systems Manual. These submarines may insert copies of Appendices A through C of this chapter in the Battery Technical Manual if desired.

(3) Require Battery Charging Electrician (BCE) and Battery Charging Electrician Forward (BCEF) qualifications to include familiarity with this chapter.

(4) Incorporate familiarity with reference (a), reference (b) and this chapter as part of the formal qualification procedures for Officer of the Deck/Duty Officer, Chief of the Watch/Inport Duty Chief, Engineering Officer of the Watch/Engineering Duty Officer and Engineering Watch Supervisor/Engineering Duty Petty Officer.

(5) Perform battery planned maintenance as specified by Planned Maintenance System (PMS) and reference (a). Where conflicts exist, PMS takes precedence over reference (a).

(6) Conduct battery charges at the frequency and in the manner specified in reference (a).

(7) Operate and maintain battery ventilation including minimum airflow requirements, as specified in reference (b).

(8) Maintain battery test discharge data using Appendix D of this chapter. A copy of Appendix D shall be included with the Submarine QBR when a test discharge is conducted during a reporting quarter.

(9) Maintain battery records in accordance with reference (a) and reference (b). The Battery Record Book (BRB) for SSBN/SSGNs is to be updated and certified by the Engineer Officer during each crew turnover.

(10) Submit a Submarine QBR as specified in reference (b).

(11) 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 except in an emergency (see reference (b)).

(12) 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.

(13) Upon battery replacement, prior to Fast Cruise at completion of a Depot Modernization Period, Engineered Refueling Overhaul or Engineered Overhaul and annually, use Appendix E 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 E inspection and correction of deficiencies in the remarks section of the QBR. Only the most recent complete copy of Appendix E of this chapter need be retained with battery records.

(14) 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 submarine's emergency and backup power supplies cannot be overstated. CASREP requirements of Out of Commission power generating or storage equipment require additional clarification.

21.3.3 SSN/SSGN 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 Class Submarine Main Storage Battery. Report low battery capacity casualties by message as allowed by operational constraints.

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APPENDIX A

TEMPERATURE VERSUS TVG TABLE

N = Number of cells in battery circuit (not jumpered out).
T_c = Average pilot cell temperature (°F) or average cell temperature (for batteries with an operating Automatic Battery Monitoring System) at the beginning of the charge operation.
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
99	293	290	288	286	283	281	279	276	274
100	292	290	288	285	283	281	278	276	274

APPENDIX B

TEMPERATURE VERSUS MCV TABLE

N = Number of cells in battery circuit (not jumpered out).
T_c = Average pilot cell temperature (°F) or average cell temperature (for batteries with an operating Automatic Battery Monitoring System) at the beginning of the charge operation.
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
99	323	320	318	315	313	310	308	305	302
100	323	320	317	315	312	310	307	305	302

APPENDIX C

TCV CALCULATION TABLE

N = Number of cells in battery circuit (not jumpered out).
T_c = Average pilot cell temperature (°F) or average cell temperature (for batteries with an operating Automatic Battery Monitoring System) at the end of the 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
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

T_c(°F)	N								
	126	**125**	**124**	**123**	**122**	**121**	**120**	**119**	**118**
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 D

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) ( )

_____ X NOTE (2) = _____ THEORETICAL AMP-HRS

(AVG PT DROP) (AMP-HRS/PT)

(1) OBTAINED FROM DISCHARGE CHARACTERISTICS AND TEMPERATURE CORRECTION TABLE.
(2) BASED ON ACTUAL LABORATORY TESTS USING 3 HOUR DISCHARGE RATE.

BATTERY TYPE	DISCHARGE RATE	AMP-HR/PT
MOD E (ASB-49)	2400	49
SEAWOLF (LLL-69)	2600	54
TRIDENT (PDX-57)	3450	91

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.) USE THE LOWEST VALUE (METER, CALCULATED OR THEORETICAL) TO DETERMINE THE 10% AND 20% VALUES.

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 E

MAIN STORAGE BATTERY INSPECTION CHECK-OFF

Battery Inspection of USS _____ Date_____

NOTE: UPON BATTERY REPLACEMENT, PRIOR TO FAST CRUISE AT COMPLETION OF A DEPOT MODERNIZATION PERIOD, ENGINEERED REFUELING OVERHAUL OR ENGINEERED OVERHAUL AND ANNUALLY, 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 E 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, (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)?	_____	____

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.

		Yes	No
c.	Charge/discharge data completed correctly?	_____	____
d.	Specific Gravity (SG) data completed correctly?	_____	____
e.	Is data recorded in accordance with reference (b)?	_____	____
f.	Did the Engineering Officer of the Watch/Engineering Duty Officer 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) and reference (b)? (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 F of this chapter?	_____	____
b.	Is Appendix D 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?	_____	____
d.	Is the date of completion for the last Appendix E inspection being reported on each QBR?	_____	____
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 (Cubic Feet per Minute)?	_____	____
10.	Capacity Test Discharges:		
a.	Was a two-ohm resistance check completed? (If applicable) (Applicable to SSGN 726, 727, 728 and SSBN 730 only until TZ-0253 Rev 0 Battery Digital Voltmeter EN DE44753 Rev D is complete.)	_____	____
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 (b)?	_____	____
12.	Are BRB entries in accordance with the instructions contained in Appendix G of this chapter?	_____	____
a.	Are BRB entries neat, legible and correct?	_____	____

		Yes	No
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%?	_____	____
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 Maintenance Requirement Cards?	_____	____
d.	Is the two-ohm resistance check done within 24 hours prior to each equalizer? (If applicable) (Applicable to SSGN 726, 727, 728 and SSBN 730 only until TZ-0253 Rev 0 Battery Digital Voltmeter EN DE44753 Rev D is complete.)	_____	____
e.	Are all cells with ICV readings of 0.10 volts below battery average checked for loose, dirty or corroded connections and completion recorded on ICV Sheet?	_____	____
f.	Have the following been calibrated:		
(1)	Ammeters:		
(a)	Emergency 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)	Emergency propulsion motor voltmeters?	_____	____
(b)	Main storage battery voltmeters?	_____	____
(c)	Main storage battery individual cell voltmeter?	_____	____
g.	Have the following had calibration checks performed:		
(1)	Hydrometers?	_____	____
(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.

h.	Are the flash arrestors cleaned and checked in accordance with PMS?	_____	____

		Yes	No
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 0.010 points of the average SG? _____ _____

(1) If no, list cells and gravities.

Date	Chg #	Cell	SG	Cell	SG	Date	Chg #	Cell	SG	Cell	SG

(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. Does the location of the pilot cells meet the criteria defined in reference (b)? _____ _____

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) _____ _____

		Yes	No
	(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/lock cabled? (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?	_____	____
l.	Are ventilation ducts and filters clean:		
	(1) Battery Inlet Filter?	_____	____
	(2) Battery Inlet Plenum?	_____	____
	(3) 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? (See reference (b) table 223-3 for allowance requirements)		

	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 09066004 5 (ASB-49), T090660036 (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	_____	____

			Yes	No
	(4)	72 inch cable assemblies (three) on SSN-21 Class	_____	____
	(5)	Eighteen LLX terminal plates on SSN 21 Class ships	_____	____
	(6)	LLX hardware jumper assemblies on SSN 21 Class ships	_____	____
	(7)	Are these assemblies complete?	_____	____
	(8)	Are these assemblies stowed in a dry place?	_____	____
	(9)	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 F

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. Original to Naval Surface Warfare Center Crane (Code 6095).

   b. One copy to the applicable TYCOM. (Commander Submarine Force Atlantic Code N43213/Commander Submarine Force Pacific Code 43213.)

   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 (ASB-49, PDX-57, LLL-69).
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.).

Block #(s)	Required Format	Remarks
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 ASB-49 X=6500; LLL-69 X=7000; 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 42-45 50-53 58-61	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.).

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 D 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 (attach additional sheets if required to keep the information legible):

(1) Date of the most recent Appendix E 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 the service 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.)	DATE OF SUBMISSION 05 Oct 95
To: Commander, Code 6095 Bldg. 3287 NAVSURFWARCENDIV 300 Highway 361 Crane, IN 47522-5001	DATE OF INITIAL FILING 09 Dec 93 DATE OF INSTALLATION 12 Feb 94
Requiring Document: Naval Ships Technical Manual Chapter 223, Vol. 1	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	■	□

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0	5	5	5	5	T	L	X	3	9	8	2	2	4	9	5			0	4
UIC				BATTERY TYPE							AGE (MONTHS)		FY RPT QTR	FISCAL YEAR		FIRST RPT	FINAL RPT	MONTHS ON OPEN CIRCUIT	

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

B-DATA AT END OF EQUALIZING CHARGE (2)

DATE MO.	DA.	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
			(58 59 60 61)		CELL				CELL				
					SP. GR.				VOLTS				

DATE MO.	DA.	YR.	BATTERY DISCHARGE RATE (6) (AMPERES)	ACTUAL TIME (MIN) (7)	AGE IN CYCLES (6)	AVG. PILOT CELL TEMP AT START AND END CELL NO.		RATED TIME (MIN) (9)	ACTUAL CAPACITY (PERCENT) (10)	NO. OF CELLS JUMPERED	FINAL VOLTS TOTAL	THREE LOWEST CELLS			
06	12	95				START	END		1 0 3 9 (72 73 74 75)			CELL	91	102	47
08	18	71	1750	186	26.7	78	96	179		0	212	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)

APPENDIX G

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 three-hour rate for all submarine battery types. The discharge rates are as follows for each battery type:

Guppy 1, Mod E (ASB-49)	2400 amps (three hr rate)
TRIDENT (PDX-57)	3450 amps (three hr rate)
SEAWOLF (LLL-69)	2600 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) 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). 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).

(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:

$$\text{Percent capacity} = \frac{\text{Actual time (min)} \times 100}{\text{Rated time (min)}}$$

(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.

NOTE: DATA SHOULD BE ENTERED INTO THE BATTERY RECORD BOOK AS SOON AS POSSIBLE UPON COMPLETION OF THE CHARGE/DISCHARGE IN ORDER TO PREVENT THE LOSS OF DATA SHOULD THE BATTERY CHARGE/DISCHARGE LOG BE LOST DURING THE REVIEW PROCESS. THIS INITIAL DATA ENTRY MAY BE DONE IN PENCIL TO PREVENT UNNECESSARY LINE OUTS UNTIL THE CHARGE REVIEW PROCESS IS COMPLETE.

(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). (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)). 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). Use the following formula to derive these values:

$$\text{Cycles} = \frac{\text{Ampere-hours (calculated)}}{\text{Service cycle}}$$

A service cycle is defined as follows:

Guppy 1, Mod E (ASB-49)	6,500 ampere hours
TRIDENT (PDX-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:

Guppy 1, Mod E (ASB-49)	6,500 ampere hours
TRIDENT (PDX-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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VOLUME VI

CHAPTER 22

TRIDENT SYSTEM AND EQUIPMENT MAINTENANCE PLANS

REFERENCES.

(a) OPNAVINST 4700.7 - Maintenance Policy for U.S. Naval Ships
(b) SUBMEPP 9086-008-814 - TRIPER Information Notebook

LISTING OF APPENDICES.

A TRIPER Information Sheet

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. In accordance with reference (a), the Type Commander will identify and prioritize corrective maintenance actions for SSBN/SSGN Class Submarine emergent repairs. 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 in the case of SSBNs and during Major Maintenance Periods (MMP) in the case of SSGNs.

a. 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 or MMP (without unacceptable impact on other refit or MMP 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 or MMP. 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 or MMP 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.

b. The Type Commander shall manage emergent repairs requiring use of TRIPER assets. In accordance with reference (a), the Type Commander will identify and prioritize corrective maintenance actions for SSBN/SSGN Class Submarine emergent repairs. Support of the Strategic Platform (SSBN) generally has the highest priority.

22.2.2 Deployed SSGN Unplanned TRIPER Change Out. An unplanned change out is not to be used as a substitute for accomplishing repairs. An unplanned change out is only to be accomplished if the deficient condition cannot be repaired or if the repair time required is unacceptable.

22.2.2.1 TRIPER Asset Segregation. TRIPER assets are segregated from normal supply process instructions and additional controls are in effect to manage these assets. Additional actions beyond normal supply procedures are required to obtain a TRIPER asset for corrective maintenance. Stake holders in the maintenance process for SSGNs must understand the TRIPER process and how to quickly identify a TRIPER asset from normal stock numbered items to ensure timely release of material from the TRIPER Program. The supply system will cancel requisitions that have not been pre-alerted to the TRIPER Program Management.

22.2.2.2 TRIPER Information Notebook. Reference (b), available as a CD-ROM from SUBMEPP, provides identification, location, Comp ID, technical data, boundary drawings and configuration change records for all components in the TRIPER Program. All TRIPER assets have a TRIPER Tag with a unique TRIPER Serial Number (TSN) engraved on it. Location of the TRIPER Tag is shown on the component boundary drawing. TRIPER assets have a "4Y" COG national stock number. When requesting a "4Y" COG asset, Appendix A must be submitted by the Fleet Maintenance Activity (FMA) to the homeport SSGN Project Team. The homeport SSGN Project Team will interact with TRIPER Program Management to ship the requested asset to the needed location.

22.2.2.3 Responsibilities.

a. SSGN: Identify the deficient component TSN via the Casualty Report message reporting system and submit work request to their Immediate Superior In Command.

b. Immediate Superior In Command: Assign job to an FMA.

c. FMA:

(1) Fill out Appendix A and forward to the homeport SSGN Project Team.

(2) Upon confirmation of receipt of delivery of Appendix A, the FMA will order the TRIPER asset via normal supply means.

(3) Receive shipped TRIPER asset, carefully uncrate and save the shipping container for use as a shipping container for the off-loaded asset carcass.

(4) Ship back the TRIPER carcass to an address provided by the SSGN Project Team in the same shipping container the received asset was shipped in.

d. Naval Submarine Support Center: Induct a separate job from the actual maintenance action Job Sequence Number for the homeport SSGN Project Team to ship the TRIPER asset to and from job location. This will allow for closing of the maintenance action Job Control Number (JCN) for work certification and maintain a separate JCN for disposition of the shipped asset to and from the deployed maintenance site.

e. SSGN Project Team:

(1) Use Appendix A, fill out the appropriate forms and deliver to the TRIPER Manager. Forms are: "REQUEST FOR UNSCHEDULED REPLACEMENT OF TRIPER ASSET" and/or "REQUEST FOR CANNIBALIZATION OF TRIPER PROGRAM ASSET". Appropriate forms can be found on the internet under Navy Forms on Line.

(2) Act as liaison between the FMA and the TRIPER Manager.

(3) Ship the TRIPER asset to desired location when released by the TRIPER Manager.

(4) Coordinate the return shipment of the TRIPER carcass to the TRIPER Manager.

(5) Close out Naval Submarine Support Center inducted job once the TRIPER Manager has received the carcass.

f. TRIPER Manager:

(1) Evaluate request priorities of the requested asset from a total TRIPER Program support position. Approve the release of the requested asset.

(2) Ensure appropriate Pre-Installation Testing and material condition assessments are conducted prior to the release of the asset to the SSGN Project Team.

(3) Release asset to the SSGN Project Team for subsequent shipping to desired location.

22.2.3 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.

22.2.4 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) in the case of Kings Bay and Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS-IMF) for the Pacific Northwest. TRIREFFAC and PSNS-IMF provides refit/MMP 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/MMP.

c. Assessing the logistic impact and reporting of, configuration changes effected by all sources in SSBN/SSGN 726 Class Submarines.

22.2.5 Updating of Submarine Logistics Technical Data. TRIREFFAC and PSNS-IMF will stage and deliver LTD Advance Change Notices and revisions to SSBN/SSGN 726 Class Submarines during refit/MMP 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 and PSNS-IMF will also provide training to Ship's Force in the proper techniques for identification, procurement and maintenance of TRIDENT LTD.

22.2.6 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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APPENDIX A

TRIPER INFORMATION SHEET

FMA will fill out this form and forward to SSGN Project Team

1. Requesting Activity: _____

2. Requesting Activity Point of Contact: _____

3. Phone number(s): _____

4. E-mail: _____

5. Date: _____

6. Ship: USS _____SSGN (_____)

7. CASREP Serial Number and/or Date Time Group of message:
_____

8. JCN: _____

9. NSN: _____

10. COG: 4Y

11. Nomenclature: _____

12. TRIPER Serial No. (TSN) of failed item TSN _____
(TSN is located on the assets TRIPER Tag)

13. FGC (S): _____

14. Requisition Number: _____

15. Description of failure: _____

16. Remarks: _____

_____

_____

_____
Printed name of FMA Repair Officer/PMA

Signature: _____Date:_____

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VOLUME VI

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) COMSUBFORINST C9460.3 - Coordinated Submarine Radiated Noise Analysis
(f) NAVSEA S9073-AF-SNC-010(C) - Ship Noise Control
(g) NAVSEA S0600-AA-PRO-230 - Underwater Ship Husbandry Manual, Chapter 23: Submarine Predeployment Noise Inspections
(h) NAVEDTRA 10500 - Catalog of Navy Training Courses
(i) COMNAVSUBFORINST 5400.25 - Standard Submarine Supply Department Organization and Regulations Manual
(j) COMNAVSUBFORINST 5400.29 - Standard Submarine Navigation/Operations Department Organization and Regulations Manual
(k) COMNAVSUBFORINST 5400.40 - Standard Submarine Combat Systems Department Organization and Regulations Manual (SSN)
(l) COMNAVSUBFORINST 5400.41 - Standard Submarine SSBN 726 Class Weapons Department Organization and Regulations Manual
(m) COMNAVSUBFORINST 5400.47 - Standard Submarine Combat Systems Department Organization and Regulations Manual (SSGN)

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 reference (e), for Commander Submarine Force Atlantic (COMSUBLANT) units and Commander Submarine Force Pacific (COMSUBPAC) units. 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 (f). 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 (g) 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 paragraph 5.c.(6) 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.

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.

NOTE: INFORMATION CONTAINED IN WORK CANDIDATES MUST BE UNCLASSIFIED. IF CLASSIFIED DATA IS REQUIRED TO FULLY DESCRIBE THE NATURE OF THE PROBLEM BEING REPORTED, REFER TO TYCOM REPORTING REQUIREMENTS TO FULLY DESCRIBE THE NATURE OF THE PROBLEM.

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 (h). Specific training requirements are contained in references (i) through (m).

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 (g).

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.

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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) COMUSFLTFORCOMINST 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 wartime. (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 quarterly and discuss actions completed and further action required to correct outstanding noise deficiencies. Special quarterly noise reduction boards should be held prior to the initial work definition conference for depot availabilities (initial planning meetings are typically scheduled; Selected Restricted Availability/Interim Drydocking A-43 weeks, Depot Modernization Period/Engineered Refueling Overhaul A-12 months) and prior to POM1 upkeep periods. 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.

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
9500 MacArthur Blvd.
West Bethesda, MD 20817-5700
Attn: Code 711 - Fleet Support Program Manager
For: New London Units, data packages should be forwarded to:
NSSC NEW LONDON CT, N42

Enclosure (2a)

For COMSUBPAC units:

Naval Surface Warfare Center
Carderock Division
Bremerton Detachment
530 Farragut Ave
Attn: Code 713
Bremerton, Washington 98314-5215

NOTE: SIPRNET FILES FROM SHIP SHOULD BE LIMITED TO 400KB. HUITS AND SAILOR-MAIL CAN BE UTILIZED FOR LARGER FILES. MP3 OR OTHER COMPRESSED FORMATS SHOULD BE USED TO SAVE SPACE. 10-15 SECONDS OF AUDIO IS USUALLY ADEQUATE. IF URGENT REQUEST ON EVENINGS, HOLIDAYS, OR WEEKENDS, HAVE SWO CONTACT TYCOM STEALTH OFFICERS TO EXPEDITE. DURING TYCOM WORKING HOURS, NOISE REDUCTION SUPPORT CAN BE PROVIDED VIA CHAT. SUPPORT CAN BE ARRANGED ON EVENINGS OR WEEKENDS THROUGH SWO.

To receive immediate feedback, audio files can be sent via SIPRNET or other secure method to:

For COMSUBLANT units:

To: SUBLANT - Michael.N.Cowan@navy.smil.mil
CC: csl.swo@navy.smil.mil (if immediate response is required), ISIC, or operational commander as required.

For COMSUBPAC units:

To: SUBPAC - Jeffrey.George@navy.smil.mil
CC: swo.csp@navy.smil.mil (if immediate response is required), ISIC, or operational commander as required.

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.

Enclosure (2b)

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TOPSIDE SURVEY

Reference: (a) MIP SO-591/901 MRC BNJ6 (R-1)

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.

Enclosure (2c)

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HOUSEKEEPING SURVEY

Reference: (a) MIP SO-591/901 MRC BNJ7 (R-2)

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, Engineering Officers Of the Watch 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.

Enclosure (2d)

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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 4910/Series 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.

Enclosure (2e)

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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/Series or System MIP

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.

Enclosure (2f)

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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.

Enclosure (2g)

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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.

Enclosure (2h)

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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) _____ _____		
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?	_____ _____	

(CONFIDENTIAL when filled in)

Enclosure (3)

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 ~
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 ~

(CONFIDENTIAL when filled in)

Enclosure (3)

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 affect 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 ~
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 ~

(CONFIDENTIAL when filled in)

Enclosure (3)

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 ~

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 9500 MacArthur Blvd. West Bethesda, MD 20817-5700 Attn: Code 711 - Fleet Support Program Manager For: New London Units, data packages should be forwarded to: NSSC NEW LONDON CT, N42
For COMSUBPAC units:	Naval Surface Warfare Center Carderock Division Bremerton Detachment 530 Farragut Ave 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)

Enclosure (3)

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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 (g)) 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 (g) 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	**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
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
(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(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(4)	X(4)	X
SUBMARINE SONAR DOMES S9165-AC-HBK-010/(U) Submarine Sonar Dome Handbook; Description and Maintenance	X	X	X(4)	X(4)	X
SE300-AY-MMA-010/(U) TRIDENT Glass Reinforced Plastic Bow Sonar Dome		X			X
SE300-AZ-MMA-010 Description, Operation and Maintenance SSN21 Class Sonar Bow Dome			X		
SE300-MA-MMA-011 Glass Reinforced Plastic (GRP) Bow Sonar Dome	X				
MISCELLANEOUS NAVSEA NOISE REDUCTION MANUALS S6360-AD-HBK-010 Special Hull Treatment, Maintenance and Repair for Submarines	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

X-Applicability

PUBLICATION Note 1	**688**	**726**	**21**	**774**	**AS**
S9561-AQ-MMA-010/(U) Low Noise Electrohydraulic Flow Control Servo Valve Model SV-438-10P; Service Instructions					X
S9073-AW-SNC-010/(U) Ship Acoustical Surveys for Submarines		X	X	X	X
S9073-AF-SNC-010/(C) Ship Noise Control	X	X	X(4)	X(4)	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(4)	X(4)	X
MIPs FOR NOISE MONITORING Platform Noise Monitoring MIP SO-544/902	X	SSGN Only	X	X	
TRIDENT Monitoring Subsystem 4190/911 (contains platform monitoring)		X			
Topside and Housekeeping Surveys, reference (g)	X	X	X(4)	X(4)	
Damping Material Survey, MIP SO-592/001	X	X	X(4)	X(4)	
Isolation System Survey, MIP SO-593/Series or System MIP					
Topside and Housekeeping Surveys MIP SO-591/901-A0			X	X	
Airborne Noise Survey, MIP SO-594/001	X	X	X(4)	X(4)	
Vibration Noise Monitoring MIP 4910/Series, See Note 3 (Machinery and Hull)	X	X	X(4)	X(4)	
NOISE CONTROL GUIDELINES 0900-LP-093-9010/(C) Noise Control Guide for SSBN 640 Class					X
Specifically Applicable Noise Road Maps (Selected Record Drawings)	X	X	X	X	X
TRIAL REPORTS NSWCCD or NSWCCD DET BREMERTON: Latest Detection & Detectability Report	X	X	X	X	
NSWCCD or NSWCCD DET BREMERTON: Latest Acoustical Trial Summary Report	X	X	X	X	

X-Applicability

PUBLICATION Note 1	**688**	**726**	**21**	**774**	**AS**
LETTERS AND INSTRUCTIONS NAVSEAINST C9073.2 (Series) Acoustical Surveys of Submarines (U)	X	X	X	X	X
COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual Volume VI, Chapter 23, Submarine Noise Reduction	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
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//
INFO COMSUBPAC PEARL HARBOR HI//
COMSUBLANT NORFOLK VA//
USS (SHIP'S NAME AND HULL NO.)//
BT
UNCLAS //N09245//
MSGID/GENADMIN/COMSUBRON (AS APPROPRIATE)//
SUBJ/(SUBS) PROPELLER CHANGEOUT//
REF/A/DOC/COMUSFLTFORCOMINST 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 CURRENT MESSAGE FORMAT AND CURRENT PLAIN LANGUAGE ADDRESS DIRECTORY (PLAD) IS UTILIZED.

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VOLUME VI

CHAPTER 24

PERIODIC MAINTENANCE REQUIREMENT PROGRAM

REFERENCES.

(a) NAVSEAINST 4790.8/OPNAVINST 4790.4 - Ships' Maintenance and Material Management (3-M) Manual
(b) NAVSUP Publication 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. Hull Integrity Procedure PMR guidance is provided in Chapter 38 of this Volume. Accomplishment of all PMRs is **mandatory**.

a. The submarine Class Maintenance Plans (CMP) form the basis of a PMR Program which takes the place of the Integrated Maintenance and Modernization Planning Program for these classes and defines the planned, corrective and inactive equipment Maintenance Requirements for all levels of accomplishment.

b. PMR work requires detailed planning and long lead time material procurement; therefore, all PMR work has been assigned to the Fleet Maintenance Activity (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 (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 Fleet 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. I-Level 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, numeric).

24.2.4 Calculating Adjusted Last Maintenance Action Date.

a. Fleet Availabilities. When a PMR is accomplished during a Fleet 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), Engineered Refueling Overhaul or a Major Maintenance Period (treated as a CNO availability for scheduling purposes only)), 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. PMR requirements are to be accomplished on or before the scheduled due date listed in the SUBMEPP TYCOM PMR Scheduling System Inventories and Schedules. 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.

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. Submarine Engineered Operating Cycle (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 (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 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 (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 MRC/MS/TRS.

(3) ALL MATERIAL LISTED ON THE 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 SSN 688, SSN 774 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 6 month or greater scheduled CNO availability 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 a fleet maintenance availability 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 PMR periodicity due to changing CNO Maintenance Availability dates is addressed in reference (d). Procedures and responsibilities are contained in Volume II, Part I, 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. 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 TRIDENT Refit Facility Kings Bay 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 I-Level 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 I-Level 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 fleet maintenance availability. 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. The PMR Inventories and Schedules are also available at https://eagle.submepp.navy.mil/ap/invsched/.

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, the Overdue PMR Status web page (https://sentinel.submepp.navy.mil/fs/pmr_status/) and the ship’s CSMP.

i. Ensure PMRs which are not accomplished by the SUBMEPP scheduled due date are rescheduled.

j. 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.

k. Review completed AWRs prior to close-out of the AWRs by Analysis, Records and Reports Section (ARRS) and resolve any discrepancies.

l. 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/Regional Maintenance Center 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.

m. 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 its 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 man hours expended also be reported on the PMR AWR or subsequent analysis of required PMR support.

n. 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 man hours 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 characters) 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 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, MRCs, Maintenance Requirements and TRSs applicable to the ship class are carried on board.

h. Ensure that 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 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 — REPORT DATE: 16 Jan 2003
SCHEDULED MPS REQUIREMENTS I-LEVEL — 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 — REPORT DATE: 16 Jan 2003

I-LEVEL INVENTORY SORTED BY SYSTEM

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 — REPORT DATE: 04 Nov 2002

SORTED BY SYSTEM

CSMP LOCATION - SSSU NLON
NSSF NLON 68316

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO	PROC TYPE	MAINTENANCE INSTRUCTION DOC (STATUS)	MCC	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

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.

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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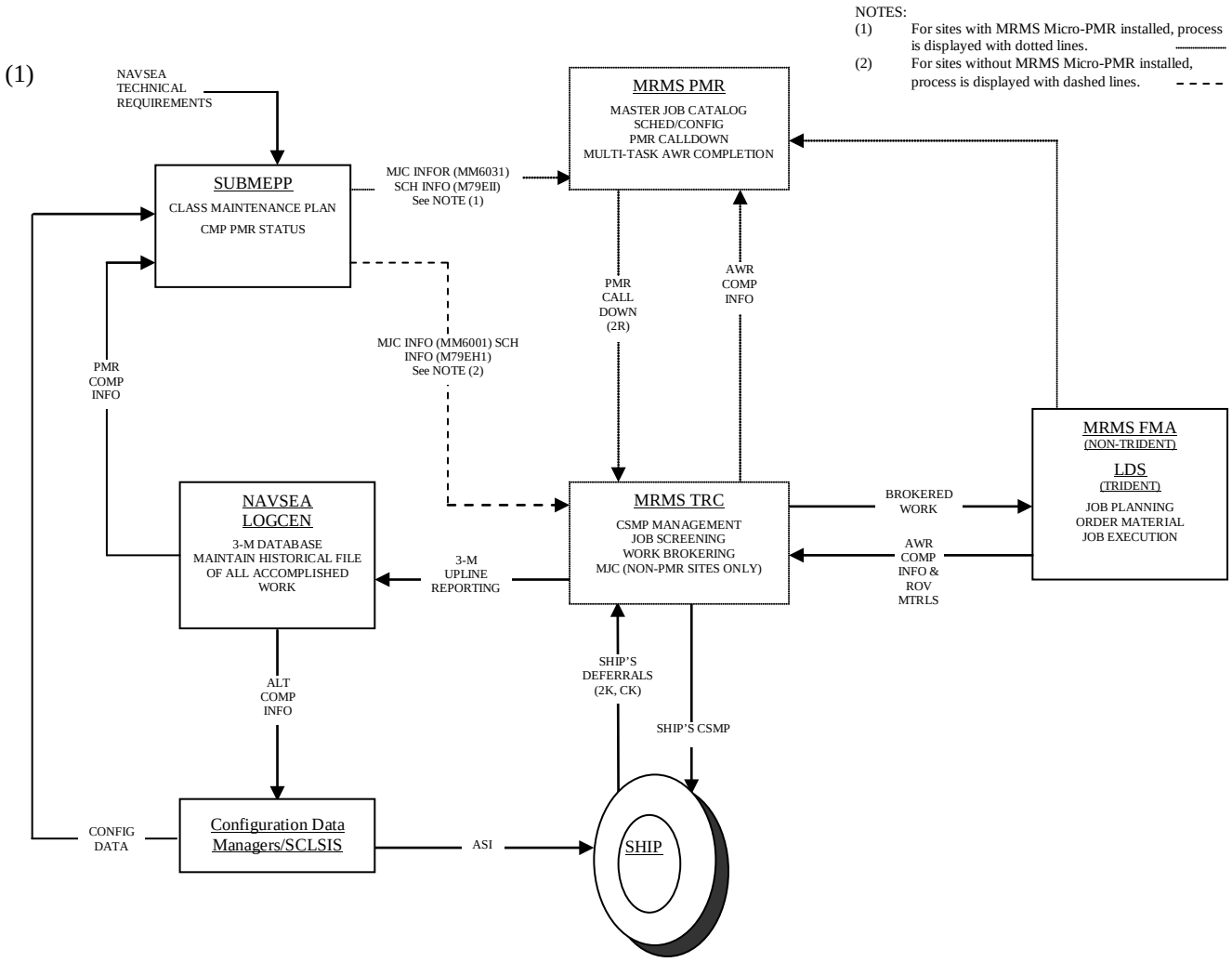
APPENDIX D

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	

SWLIN 204A01 PART 1 PAGE - 2

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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

CHG	WPS SWAB GCMA	MA DESCRIPTION WPS COMPID	PER	LMA VIT	DUE DATE	MJC#	WORK PACKAGE STATUS (AUTHORIZED BY) 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
PAGE 8 OF 13

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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 will contain unique Job Control Numbers (JCN) consisting of ship's Unit Identification

Code (five characters) plus WC (Department/Division + JC) (four characters) plus Job Sequence Number (four characters). 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 will contain unique JCNs consisting of ship's Unit Identification Code (five characters) plus WC (Department/Division + JC) (four characters) plus Job Sequence Number (four characters). 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, etc.) the adjusted LMA date will be the first of the month following the completion date listed on the PMR data form.

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). As a minimum, ISICs will schedule applicable URO MRCs 40 days (SSBN/SSGN 726 Class submarines) or 40 days (non-SSBN/SSGN 726 Class submarines), as applicable prior to refit fleet maintenance availability. Those URO MRC AWRs requiring work packages or other planning are forwarded to the FMA Planning Section.

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 (3-M) 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 Lead Work Centers (LWC) 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, Part I, 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 of the quarterly report from SUBMEPP, perform a line-by-line verification of each ship's new URO MRC Inventory and Schedule against the URO MRC Inventory and Schedule report held by the ISIC. At a minimum, this verification will include a review of each URO MRC LMA, Due Date, and Periodicity to ensure any recent completion data or rescheduling data that has been submitted to SUBMEPP has been accurately incorporated into the new Inventory and Schedule. 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 held by the ISIC 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.

(4) Following receipt of the URO MRC Inventory and Schedule quarterly report from SUBMEPP the ISIC shall provide the following material to each applicable ship:

(a) A copy of each PMR Inventory and Schedule CD.

(b) A copy of each organizational level URO AWR assigned to Ship's Force and scheduled for accomplishment during the next refit/availability.

(c) A copy of the individual ship's URO MRC Inventory and Schedule that has been customized by the ISIC to include information more current than the quarterly report provided by SUBMEPP and JSN scheduling information entered by the ISIC URO MRC coordinator.

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, Part I, 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. For visual inspections in between URO MRC 003 inspections, see Volume V, Part I, Chapter 5, paragraph 5.8.3.d. of this manual for a description of requirements to inspect submarine hull structure in between the periodic URO MRC 003 inspections.

c. 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.

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. QAS/S: YES NUC L/I: 1NUC WPR: SP CLN: SPECID: RADCON:
L/I: 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 L/I:          NUC WPR:          SP CLN:           SPECID:           RADCON:
                L/I:             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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COMPID / HSC	LINE ITEM / RIC	COMP SERIAL / EIC	R MJC NO	M PROC TYPE	MAINTENANCE INSTRUCTION DOC	STAT	ML	DD	LAST WRK CTR JSN	CC	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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COMPID / HSC	LINE ITEM / RIC	COMP SERIAL / EIC	R MJC NO	M PROC TYPE	MAINTENANCE INSTRUCTION DOC	STAT	ML	DD	LAST WRK CTR JSN	CC	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) COMUSFLTFORCOMINST 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.)

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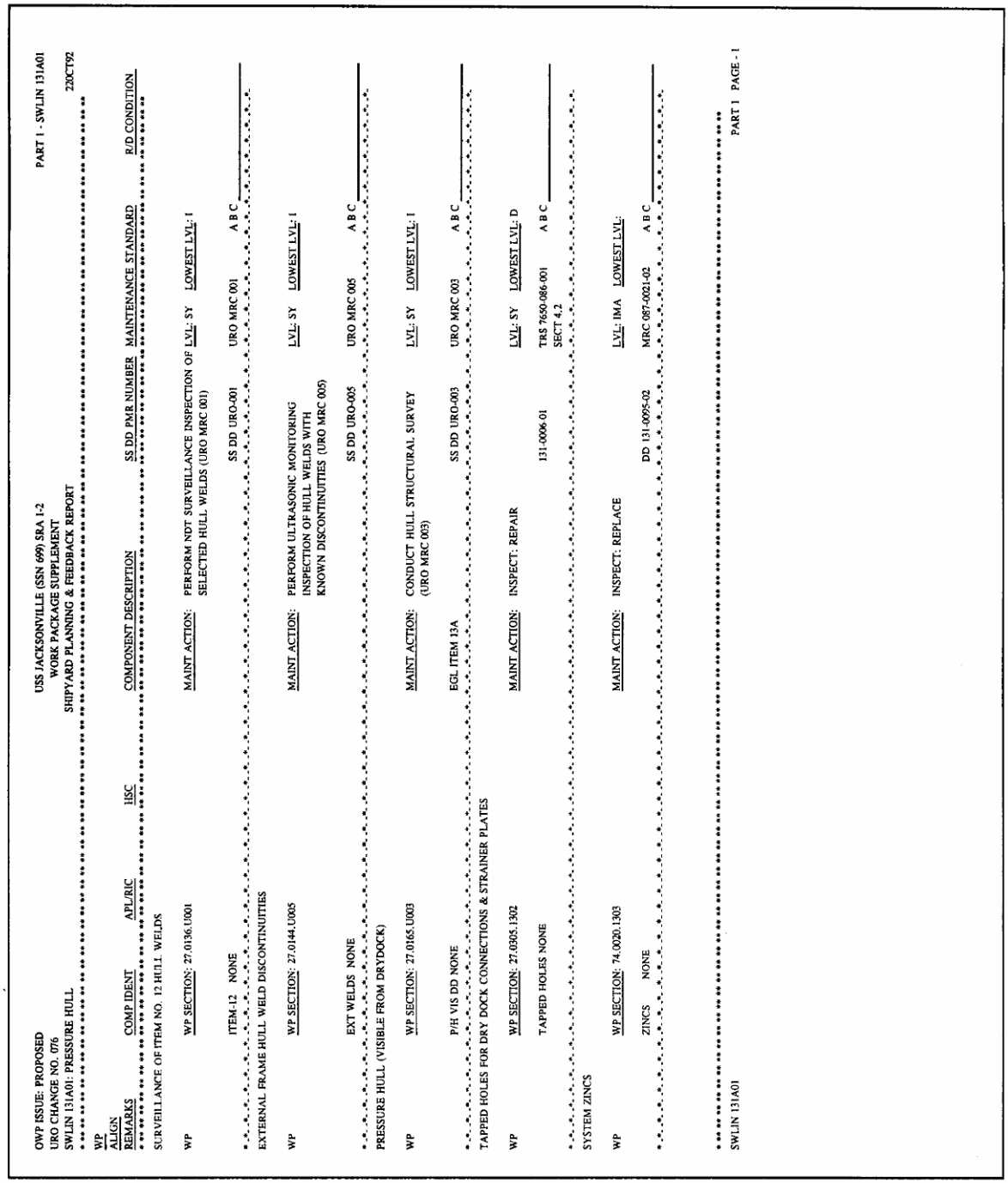
APPENDIX F

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
22OCT92

WP ALIGN REMARKS | COMP IDENT | APL/RIC | IISC | 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 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 - NSTM Chapter 631 (Preservation of Ships In-Service - General)
(d) NAVSEA MS 6310-081-015 - Submarine Preservation
(e) OPNAVINST 5100.19 - Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
(f) 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 utilize every effort to accomplish a full three week SPRUCE consisting of 14 days of production. ISICs may approve a shorter SPRUCE below decks of 5 to 14 days of production time on a case-by-case basis due to operational requirements. Total allotted time for SPRUCE will at no time be less than 12 days to encompass preparation and gas off periods. A shorter production period will equate to a corresponding reduction in the overall amount of square footage accomplished during the scheduled period. When a shorter period is executed for below decks SPRUCEs, meticulous attention should be given toward the accomplishment of additional below deck SPRUCE periods to ensure sufficient preservation is achieved to facilitate 33+ years hull life. SPRUCEs not meeting three weeks in duration shall be properly documented by ISICs to ensure a complete history of ship's preservation is available.

Ship returns to port 0 days

Preparation period 2 days

Production period XX days

Gas off period 5 days

TOTAL 7+XX days

c. ISICs shall schedule a one week SPRUCE for the sail interior every 24 months. Sail SPRUCEs can be coincidental with routine availabilities.

d. 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), Engineered Refueling Overhaul, or Engineered Overhaul because of the industrial activity's preservation programs.

e. The initial base date for scheduling is the official completion date of the ship's last DMP, Engineered Refueling Overhaul, or Engineered Overhaul.

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) and reference (d), as applicable. 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) and (d), as applicable, through (f).

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) and (d), as applicable, (e), and (f) 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

Pre-Cleaning Method

Defects Corrected

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 - General) and reference (d)?
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 force ships/aircraft carriers 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 1 - 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 2 - 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 3 - 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 1 are corrected immediately. Deficiencies classified as Category 2 should be scheduled for repair during the ship's next regularly scheduled industrial availability as work priority permits. Category 3 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 a major or minor Chief of Naval Operations availability. 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 assessor. 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 1 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 Maintenance Center. 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 as specified in Part II of enclosure (1) of reference (a).

(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 1 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 Maintenance Center. The final report should contain a list of Ship's Force personnel trained as cableway assessors/repairmen, including names 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 1 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/RMC//(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/COMUSFLTFORCOMINST 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 1	CAT 2	CAT 3	TOTAL
ITEMS IDENTIFIED	_____	_____	_____	_____
ITEMS CORRECTED	_____	_____	_____	_____
ITEMS REMAINING	_____	_____	_____	_____
ITEMS DOWNGRADED	_____	_____	_____	_____

2. CABLE/CABLEWAY DISCREPANCIES.

	QUANTITY	PERCENTAGE
DEAD-ENDED CABLES	_____	_____
IMPROPER EQUIPMENT/BULKHEAD 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	_____	_____
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 (last four digits only)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

BT

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

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) OPNAVINST 5100.19 - Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat
(d) 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 hand held pyrometers.

(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 pyrometer 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 pyrometer on the object to be inspected. Record pyrometer 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 pyrometer. 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 pyrometer 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 pyrometer 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 pyrometer, 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 Asbestos Control and Safety. All personnel shall understand and adhere to the policies and procedures provided in references (a) and (c) regarding the handling of asbestos. Those persons that meet the criteria in reference (c) shall be enrolled in the Asbestos Medical Surveillance Program.

29.4.2 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.

29.4.3 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 its 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).

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 spiral wound metal 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 (d). 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.

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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 Fleet Maintenance Activities (FMA).

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.

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).

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VOLUME VI

CHAPTER 31

SURFACE FORCE SHIP MAINTENANCE PLACEMENT AND OVERSIGHT BUSINESS RULES

REFERENCE.

(a) NWP 1-03.1 - Naval Warfare Publication Operational Report

LISTING OF APPENDICES.

A RMC Spotlight Reports

31.1 PURPOSE. The purpose of this chapter is to provide procedures and guidance regarding ship maintenance placement and oversight business rules. These procedures and guidance affect Regional Maintenance Centers (RMC), Type Commanders (TYCOM) and Ship Maintenance Teams.

31.2 BACKGROUND. Current directives demand a culture of readiness. The process described here addresses the need for a flexible maintenance support system that increases efficiency without compromising effectiveness, and defines a common planning process for ship maintenance and modernization. These processes need to be disciplined with objective measurements and institutionalized with a continuous improvement methodology.

31.3 SHIP MAINTENANCE FUNDING MANAGEMENT BUSINESS RULES.

31.3.1 Scope. The goals of the entitled funding process are to reduce premiums paid for maintenance while simultaneously improving the ability to respond to maintenance and operational requirements. The funding business rules establish the central role of the Ashore Ship's Maintenance Manager working with the ship's Commanding Officer to manage the funds required to support all maintenance for a given ship. Starting with the submission of an overall Maintenance and Modernization Business Plan (MMBP), the Ashore Ship's Maintenance Manager will establish the quarterly distribution of controls from the established annual maintenance target needed to accomplish the ship's maintenance in the most efficient manner. The process provides the ship with a level of funding stability that will provide for the execution of an effective maintenance plan.

31.3.2 Ship and Maintenance Team Business Responsibilities.

a. Each ship's Maintenance Team is led by the Ashore Ship's Maintenance Manager. The Ashore Ship's Maintenance Manager coordinates with the RMC to execute maintenance in accordance with Fleet and TYCOM maintenance policies and directives. The TYCOM shall ensure that each ship's Business Plan is tailored to fit unique geographic and business climate situations.

b. The Maintenance Team (primarily the ship's Commanding Officer working with the Ashore Ship's Maintenance Manager) supports the Fleet Maintenance Officer and TYCOM in identifying budget needs based on well documented requirements in the Current Ship's Maintenance Project (CSMP), the Class Maintenance Plan, the Baseline Availability Work Package, the class Technical Foundation Paper and historical data. The Ship's MMBP identifies the total funding budgeted to support the ship during the execution year, along with advance planning funding for availabilities to be executed in future years. The TYCOM determines how much of the Ship's MMBP they can fund (controls) of the total requested, and how much money per quarter (phasing plan) they can provide for executing the Ship's MMBP. The following guidelines are not all inclusive but should be considered when structuring the phasing plan:

(1) The Maintenance Team will receive their actual spending levels or controls from the TYCOM. The RMC, with the TYCOM's approval, may adjust controls between maintenance teams as required during the course of the execution year. The goal is to establish controls before the execution year starts and then maintain these controls fixed throughout the execution year.

(2) The Maintenance Team provides the RMC and TYCOM with a quarterly spending or phasing plan based on their Ship's controls. The plan should be consistent with the ship's operational cycle and predefined maintenance periods. For example, deployments and underway periods in a given quarter should cause the displacement of Continuous Maintenance (CM) controls to other quarters where the maintenance is likely to occur.

(3) Funds will be provided to Maintenance Teams early enough to avoid premiums associated with late contract award, definitization or assignment of work.

c. Significant deviations from the final negotiated MMBP or controls will be documented in a Summary of Events. It is recognized that the drivers for MMBP changes are often outside the direct control of the Maintenance Team and will be documented as such. The fundamental guidelines for executing at MMBP financial control levels are:

(1) Follow the guidance in Volume II, Part II, Chapter 1 of this manual regarding screening and brokering of work candidates.

(2) During the execution of an availability, growth and new work should be authorized only if the Business Case Analysis indicates that this is the best course of action, taking into consideration all applicable business and operational risks and factors.

d. The Maintenance Team, with the TYCOM's approval, may shift controls between the Chief of Naval Operations (CNO) availability and CM budget lines in order to most efficiently accomplish required maintenance and modernization. No more than 25% of the CM controls for an individual ship shall be moved to the CNO availability without TYCOM approval.

e. The Maintenance Team shall schedule continuous maintenance availabilities per Volume II, Part II, Chapter 2 of this manual. Adjustment of Continuous Maintenance Availability dates shall be coordinated with the RMC and requested from the Immediate Superior In Command via naval message. Date changes shall be minimized in order to realize the maximum benefit from advance planning work. The Maintenance Team may not change CNO availability dates. The Maintenance Team shall resolve CNO availability scheduling issues with the TYCOM via the RMC. The TYCOM shall include Program Executive Office (PEO) Ships in any discussions resulting in availability date changes when Program Alterations are scheduled for the availability.

f. The Maintenance Team shall review proposals for fair and reasonable costs, work scope and applicable technical aspects prior to the Technical Analysis Report (TAR) process.

g. The Maintenance Team has the authority to adjust the MMBP in response to changes in ship operations, planned maintenance periods, and other business case reasons provided the intended distributions do not exceed the total remaining annual budget requirement allocated for that ship. This redistribution will be documented via a revised quarterly phasing plan, a Summary of Events prompting the change, and a formal recovery plan, which will be submitted to the TYCOM via the RMC for approval and adjustment of the Maintenance Team controls. Over the course of the fiscal year, some minor adjustments to the phased funding requirement can be expected. The cognizant RMC, with approval from the TYCOM, will establish funding redistribution limits below which a formal recovery plan would not be required, however, the revised quarterly phasing plan and Summary of Events would still be needed for approval. Ship's Commanding Officers shall ensure that their Immediate Superior In Command is advised of any proposed changes to their MMBP which may affect operational schedules or planned modernization.

h. The Maintenance Team may not unilaterally adjust the MMBP when the adjustments would exceed the total remaining funding controls allocated for the ship. Any requirement in excess of the total MMBP currently approved will require the submission of a revised quarterly phasing plan, a Summary of Events related to the change, and a formal recovery plan. The RMC will evaluate the increased requirement and will make their recommendation for approval to the TYCOM based on total controls available. The RMC may not exceed an individual ship's total funding controls.

i. Depot level maintenance will normally be screened to the Multi-Ship/Multi-Option (MS/MO) contractor. The Maintenance Team may go to other contracting vehicles when:

(1) The MS/MO contractor and government cannot agree on cost and scope.

(2) The MS/MO contractor does not have the capability or capacity.

(3) Indefinite Delivery, Indefinite Quantity/Commercial Industrial Services (or Simplified Acquisition Purchases and a qualified vendors list) is available.

(4) Other organic RMC assets are available and have the capability for the work.

(5) Work is to be accomplished outside of homeport area.

(6) Work is to be accomplished by an Alteration Installation Team (AIT).

j. During the execution of a maintenance availability, it is anticipated that deficiencies will be identified that could be accomplished as either growth or new work on the existing contract. The Maintenance Team shall perform a Business Case Analysis to decide whether or not to add the work to the current availability or schedule it during another maintenance opportunity.

k. When work deferral reduces the total cost of the job or maintenance completes with a cost under-run and funds can be recaptured, the funding controls will normally remain under the control of the respective Maintenance Team. If the funds are needed for critical work on another ship or to cover a funding shortfall at the TYCOM/Fleet level, the TYCOM will redistribute as necessary. The change will be documented in a revised quarterly phasing plan and the Maintenance Team(s) should provide to the RMC an impact statement and recommended plan to mitigate the effects of the plan change.

l. The RMC coordinates with the Maintenance Teams to comply with their approved ship's MMBPs. The RMCs shall make a monthly MMBP execution report to the TYCOM.

m. Maintenance Teams will issue funds to the appropriate executing activity by submitting a planning estimate to the TYCOM (via the RMC) and the TYCOM will issue the actual funding document.

n. MS/MO contractors normally submit cost reports to Maintenance Teams on a bi-weekly basis. The Maintenance Team will utilize these reports to assess the cost performance of the MS/MO contractor and address items of concern to the RMC and/or TYCOM.

31.3.3 Regional Maintenance Center Business Responsibilities.

a. The RMC Commander has the authority to execute Surface Force Ship maintenance and shall do so in accordance with Fleet and TYCOM policies and directives.

b. The RMC Commander develops an execution year spending plan for the TYCOM's approval based on the TYCOM approved MMBPs.

c. The Fleet Commander spending controls are issued to the TYCOM who then assigns spending controls to each Maintenance Team, informing the RMC. The RMC issues quarterly spending controls to all of the Maintenance Teams in accordance with the TYCOM's final TYCOM approved MMBP for each ship.

d. The RMC Commander will evaluate MMBP adjustment requests based on the Summary of Events, recovery plan, and quarterly adjustment provided by the Maintenance Teams. If the RMC supports the request, the RMC will forward the issue to the TYCOM for approval.

e. The RMC Commander shall request approval from the TYCOM whenever redistribution of annual ship funding is required. The RMC shall provide the TYCOM a record of all control changes for tracking purposes. Redistribution of funds between Active Fleet and Reserve Fleet funding lines or between different TYCOMs requires approval by the Fleet Commander.

f. In the event of significant program wide control changes the RMCs shall:

(1) Provide an impact statement to the TYCOM regarding the effect on the execution of maintenance.

(2) Provide a recommendation to minimize the impact on Force readiness.

g. The RMC shall evaluate the financial status of each of the Maintenance Teams on a monthly basis.

h. The RMC shall submit monthly financial summary reports to the respective surface TYCOM. This report provides a comparison of actual versus planned funding execution. The last report for the execution year will include an annual summary showing how the funds were utilized, sorted by Naval Operations resource sponsor.

i. C3/C4 Casualty Reports (CASREP), or a C2 CASREP with reasonable potential to become a C3/C4 CASREP, are identified as emergent maintenance and will be funded with emergent dollars. Emergent work will be scheduled to minimize premiums in as much as the operational schedule will permit. C2 CASREPs will normally be corrected using the CM Process. Consideration will be given to schedule all maintenance, including emergent, at an opportune time to reduce premiums. The RMC Commander may, with the respective TYCOM's prior approval, convert Emergency Maintenance funds to execute CNO availability or CM maintenance.

j. Except as stated in paragraph 31.3.3i. of this chapter, C2 CASREPs will be corrected during CM periods (both scheduled Continuous Maintenance Availabilities and maintenance Windows of Opportunity) using CM funds. C2 CASREPs discovered during a CNO availability or Continuous Maintenance Availability will be addressed as new work. C2 CASREPs may be allowed to "age" until the appropriate repair opportunity. The RMC Commander has the responsibility to request TYCOM authorization when Emergency Maintenance funds should be used for the correction of C2 CASREPs or other non-CASREP related, but nonetheless urgent maintenance. The RMC is required to approve any planned delay of action on a CASREP. In the event that the delay effectively constitutes a CASREP deferral in accordance with reference (a), the RMC will forward the deferral recommendation to the TYCOM for approval.

k. The RMC Commander will generate monthly maintenance availability metrics for all assigned ships planning for a CNO availability and ships in a CNO availability. These metrics will be briefed at least monthly to the TYCOM at Surface Team 1 Maintenance and Modernization Continuous Improvement Team meetings. The business rules for preparation of these forms are included in Appendix A.

31.3.4 Type Commander Responsibilities.

a. The TYCOM establishes Force maintenance policies and directives, consistent with Fleet Commander guidance, and authorizes the Maintenance Team and RMC to act as the principal agent to execute those policies and directives.

b. The TYCOM will provide a list of Fleet Alteration requirements for the execution year as input to the ship's business plan no later than 15 February in the year prior to execution. To assist with business plan development, the TYCOM will identify which alterations are scheduled for accomplishment and will provide the Maintenance Team and RMC with the cost estimates for accomplishment.

c. When the Fleet issues the spending controls to the TYCOM, the TYCOM will in turn issue spending controls to the RMC and update those spending controls on a quarterly basis.

d. The TYCOM has the authority to recapture spending controls previously issued to the Maintenance Teams and RMCs in response to unforeseen Force budget requirements. This will be used as a last resort, as the goal is to maintain stable funding plans in support of ships' MMBPs.

e. If it is determined that the best course of action is not to fund a CNO availability, the TYCOM must (with concurrence from United States Fleet Forces or Commander, Pacific Fleet, whichever is appropriate) approve the removal of funds before the RMC initiates this action. The TYCOM shall ensure PEO Ships is included in the decision process to not fund any availability where Program Alterations are scheduled for accomplishment during that availability.

f. The TYCOM will evaluate MMBP adjustment requests forwarded by the RMC based on the Summary of Events, recovery plan, and quarterly adjustment provided by the Maintenance Team. If the TYCOM supports the request but lacks spending "controls" required, the TYCOM will forward the issue to the Fleet for approval and additional controls.

g. The TYCOM will evaluate the RMC's end of month financial status reports to assess the degree of conformance to the approved RMC consolidated spending plan.

31.4 MAINTENANCE PROPOSAL REVIEW. The maintenance process must be flexible enough to be able to respond to changing operational requirements. The key to this flexibility is to reduce the cycle time involved prior to the actual execution of the maintenance. The Continuous Estimating, Incremental Planning Review Process

guidelines will be utilized by the Maintenance Team to approve all proposed maintenance actions within time and budget constraints. The guidelines apply equally to Advance Planning, Long-Lead-Time Material, CNO, CM and Emergent Maintenance work.

31.4.1 Concept. The entitled process concept enables the Maintenance Team to review planned work items and estimates on a continuous basis as they are received. The Ashore Ship's Maintenance Manager is empowered to shift work items from CNO to CM or vice versa to optimize work scheduling and reduce premium exposure and overall cost.

31.4.2 Business Rules.

a. The Ashore Ship's Maintenance Manager with support from the Maintenance Team shall analyze the work package against the availability schedule. In general, Maintenance Teams should consider scheduled availability lengths fixed and attempt to adjust the work package to ensure it can be completed within the scheduled dates. When justification exists, the Maintenance Team should recommend availability length adjustments to the TYCOM to minimize premiums.

b. The Ashore Ship's Maintenance Manager with support from the Maintenance Team shall analyze the work package against potential CM windows of opportunity to maintain the scheduled dates of the availability, to best level load the contractor, and to minimize premiums.

c. The Maintenance Team may not change CNO availability dates and shall resolve scheduling issues with the TYCOM via the RMC. The TYCOM shall include PEO Ships in any discussions resulting in availability date changes when Program Alterations are scheduled for the availability.

d. Work packages shall be developed on a continuous basis starting no later than A-240 days in order to realize cost savings and avoid premiums associated with late identification of work in accordance with the business rules contained in Volume II, Part II, Chapter 2 of this manual.

e. When capability and capacity allow, work shall be brokered to the Fleet Maintenance Activity, otherwise, Depot level maintenance will normally be screened to the MS/MO contractor. The Maintenance Team may go to other contracting vehicles when:

(1) The MS/MO contractor and government cannot agree on cost and scope.

(2) The MS/MO contractor does not have the capability or capacity.

(3) Other organic RMC assets are available and have the capability for the work.

(4) Work is to be accomplished outside of homeport area.

(5) AIT/Indefinite Delivery, Indefinite Quantity has been identified by the Naval Supervisory Authority (NSA) as the preferred provider due to cost reasonableness.

f. The Maintenance Team shall review proposals for fair and reasonable costs, work scope and applicable technical aspects prior to the TAR process.

31.4.3 Continuous Estimating Incremental Planning Review Process. The Continuous Estimating Incremental Planning Review Process (CEIPRP) is the process by which the Maintenance Team continuously compares MS/MO contractor work item estimates to independently developed government work item estimates throughout the development of the work package. Completion of package development and submission of the 100% Work Package Proposal is followed by the Technical Cost and Scope analysis, proposal revisions, final TAR, establishment of the Prorate, Pre- and Post Business Clearance, and signing of the bi-lateral contract modification (definitization).

31.4.3.1 Concept. Use of the CEIPRP is intended to achieve flow of work items into the work package up to 100% lock while continuously comparing government to contractor estimates to avoid last minute surprises due to estimate differences. This process also allows for flexibility up to the 100% lock in order to develop a package that best addresses the material condition of the ship as it begins the availability. Following the planning activity specification development, the MS/MO contractor continuously submits Planning Estimates. Simultaneously, the government Maintenance Team continuously develops the Independent Government Estimate (IGE). These two estimates are then compared and any differences in scope and price (generally: those in excess of 10% difference) are resolved. Resolving these differences during work package development also reduces the amount of time required for the final TAR process. Following the 100% package lock, the planning activity completes planning, the

MS/MO contractor assembles and submits the 100% package proposal. Based on the 100% package proposal, an estimate of prorates is communicated to resource sponsors along with a final funding notification in order to ensure on-time funding. This is followed by completion of the final TAR and business clearance processes.

31.4.3.2 Business Rules.

a. The contractor shall continuously submit Class C estimates for each work item as a bottom line work item cost. The Planning Estimate provides a budget level tracking and establishes a basis for determining cost reasonableness. Paragraph cost estimates will be provided by the MS/MO contractor when requested by the government to resolve differences between the contractor's Planning Estimate and the IGE.

b. The IGE is the government's detailed estimate to the trade and paragraph level. The IGE provides budget level tracking and establishes a basis for determining cost reasonableness allowing the government to validate the Planning Activity Estimate and resolve any differences in scope or cost estimates.

c. The package will the "Locked" at the 50% and 80% budget to ensure that work has been brokered to planning activities continuously. These milestones also reinforce timely identification of work by Ship's Force. Following the package Locks, the planning activity will complete planning and estimating.

d. Upon completion of the Planning Activity Estimate, that estimate will be compared to the IGE for the "locked" portion of the package as a snapshot of the status of the work package development.

e. The 100% package lock is the official milestone to mark identification of 100% of the work requirements for an availability based on the MMBP budget. All work added to or deleted from the package after the 100% lock will be via an errata or addendum.

f. The Final Funding Notification with Estimates of Prorates will be a formal communication with resource sponsor (Email or Naval Message) with funding requirements. Estimate prorates based on Basic Work Package Proposal man-hour estimates, historical prorate data and sponsor requirements. The Maintenance Team should ensure that estimates provided to various sponsors throughout the planning process include anticipated prorate amounts.

g. The final TAR (total package) will include all necessary information to develop a negotiation strategy, pricing recommendation and rationale to support a scope conference, if necessary, and subsequent work package cost definition. It shall include background information, essential contractor proposal information, method of evaluation, scope of work, analysis of work items with rationale to support questionable costs and summary of pricing recommendations.

h. A scoping conference, if necessary,shall include the appropriate members of the Maintenance Team, Technical Analyst, Administering Contracting Officer (ACO) or Contract Negotiator and contractor. All work items with unsubstantiated differences identified in the TAR are discussed to reach agreement on the scope of work and contractor's proposal. When all differences have been resolved, the conference shall end with an agreement on labor hours, subcontracts and materials between the contractor and ACO or Contract Negotiator.

i. The ACO or Contract Negotiator will take the work scope conference results and ensure correct application of indirect rates, fees and prepare appropriate documentation for signature and cost definition.

j. The ACO representative will negotiate target costs for new work.

k. The Maintenance Team will minimize growth and overtime. Growth items that cannot be settled by the Maintenance Team shall be forwarded to the Technical Analyst to be settled in the TAR process.

31.5 GUIDANCE FOR FIRM FIXED PRICE CONTRACTS.

31.5.1 Overall Process. Unless specifically noted otherwise, the following are common practices in both the MS/MO and Firm Fixed Price (FFP) contracting environments:

a. Validation, screening, and brokering process.

b. Maintenance Teams.

c. Planning Board for Maintenance.

d. MMBPs.

e. Movement of work between CNO and CM.

f. Maintenance Team metrics.

31.5.2 Firm Fixed Price Planning. Government activities shall accomplish FFP planning with the goal of compiling a complete, clear, concise and well-defined work package. The Ashore Ship's Maintenance Manager shall work with the Maintenance Team to define the work scope and solicitation in a FFP environment. The following points shall be considered in the planning process for FFP contracts:

a. Assessments are an important part of the planning phase of any availability. The Ashore Ship's Maintenance Manager shall ensure assessment results are considered for inclusion into the work package. The Ashore Ship's Maintenance Manager shall also determine if additional assessments should be accomplished so that the material condition of critical systems and equipment can be determined prior to the work package lock date.

b. Proper work screening between CNO and CM availabilities is critical in order to reduce costs and premiums.

c. Work placed in a CNO FFP Availability should be limited to work requiring a facilitated shipyard, work that can not be accomplished in short CM availabilities, or work that must be accomplished in the availability to support operational readiness.

d. When work, following the guidelines identified in paragraph 31.4.2b. of this chapter, cannot be accomplished in the designated time period without excessive premiums or with a low probability of success, the RMC Commander shall be informed. Conversely, the RMC Commander shall also be informed when there is insufficient work to justify a CNO availability.

e. The use of proven, re-useable FFP work specifications by Maintenance Teams and planning activities should be the norm, not the exception.

f. Ashore Ship's Maintenance Manager with assistance from the Maintenance Team shall review all contract work specifications prior to issue, and specification review changes shall be recorded and tracked by the planning activity.

31.5.3 Firm Fixed Price Placement. When building the availability package in preparation for contract placement, consideration shall be given to risk mitigation to avoid premiums during execution due to late work identification. The use of Reservations and Option Items builds in flexibility to FFP contracts when it is impossible or impractical to adequately define all requirements.

a. Option Item guidelines:

(1) Option Items are to be utilized in a contract solicitation when there is a strong expectation the work will be accomplished if the prerequisite conditions requiring the work are met as a result of an event, inspection, or milestone.

(2) Prior to solicitation, the availability schedule shall be evaluated to ensure each Option Item can be accomplished during the contract performance period.

(3) Material status shall be confirmed to ensure Option Item material will be available to support the production schedule.

(4) Funding for Option Items will be managed by the Project Manager within the ship's designated annual funding allowance under their MMBP, by either designating Reservations in the availability budget or by using CM funds.

(5) Option Items shall be invoked as early as possible, preferably during the period between contract award and the start of the availability. The later an option is exercised, the greater the probability that premiums will be paid for its execution.

(6) A listing of all Option Items, including their respective "Not Later Than" invocation dates, shall be provided to the RMC by the planning activity in the turnover letter. The Project Manager must be made aware of all Option Items and invocation dates well in advance of the availability start date. (The Maintenance Team provides the Option Items and invocation dates. This is discussed in the contract solicitation review board.)

(7) Option Items are not to be used as a "shopping list", and are reserved for work with a high expectation of being required. Lack of funds for a specific work item shall not be used as justification for including that work as an Option Item.

b. During FFP solicitation, bidder's questions may be submitted to the Procurement Contracting Officer. The following processes related to bidder's questions should be followed:

(1) The Maintenance Team shall not respond directly to bidder's questions. There must be a single point of contact for bidder's questions and answers. If queried directly, the Maintenance Team shall refer the bidder to the Advance Planning Manager.

(2) The RMC Procurement Contracting Officer shall ensure the Maintenance Team is provided with e-mail notification of all bidder's questions.

(3) The Maintenance Team shall provide inputs to bidder's questions to the Procurement Contracting Officer within 24 hours (unless the response is required immediately, or another time period is agreed upon).

(4) The Maintenance Team input shall be considered when formulating the Government's response.

(5) The final answer to bidder's questions shall be made available to the Maintenance Team via e-mail or other electronic means.

c. FFP Oversight. During FFP availability execution, oversight of contract changes is critical to managing costs and reducing premiums. Processes that assist in the management of funds and reduction of premiums include:

(1) Conduct a business case for all growth and new work to determine the most efficient and cost effective time to execute the work.

(2) Recognize that late work premiums exist, and account for these premiums when it is necessary to add growth or new work to the availability.

(3) The RMC Project Manager shall identify and record all validated Delay and Disruption charges paid by the Government using growth codes as a result of Navy actions. Discuss each Delay and Disruption event during Planning Board for Maintenance to prevent repeat occurrences.

(4) Project Manager, with the Maintenance Team, shall document "lessons learned" during availabilities and provide these to the RMC for proper distribution and training of other Maintenance Teams.

(5) Departure Reports shall be provided to the Maintenance Team, ensuring all applicable safeguards are in place to handle Business Sensitive Information.

APPENDIX A

RMC SPOTLIGHT REPORTS

1. PURPOSE. Establish guidelines for preparing an RMC Spotlight Presentation. This presentation is applicable to all ships undergoing planned (CNO/CMAV) availabilities.

2. SCOPE.

   a. This business rule describes the format and processes required to compile an RMC Spotlight Presentation.

   b. Applies to all Regional Maintenance Centers (RMC).

   c. Implements the standardized process to be used by all RMCs.

3. GENERAL REQUIREMENTS/BACKGROUND.

   a. The RMC Spotlight Presentation consists of six sections: Project Spotlight Chart, Premium Performance Chart, Package Build Chart, Hot Wash Status Report, and Global Hot Wash Data.

   b. The Project Spotlight Chart is a snapshot of the planning milestone status and execution performance for the RMC's CNO availabilities. Examples of FFP and MS/MO Spotlight Charts are given in this appendix.

   c. The Premium Performance Chart is a snapshot of the performance with regard to premiums and churn for a specific ship in the execution phase of a CNO availability. An example Premium Performance Chart is given in this appendix.

   d. The Package Build Chart is a snapshot of the relationship between the value of the work package, as it is being developed, to the planned and budgeted limits for a specific ship in the planning phase of a CNO availability. It is extracted from the budget tab in Navy Maintenance Database (NMD). An example Package Build Chart is given in this appendix.

   e. The Hot Wash Status Report is a snapshot of an RMC's local and global Hot Wash issues from past CNO availabilities. An example Hot Wash Status Report is given in this appendix.

   f. The Global Hot Wash Data Report provides amplifying information regarding current global Hot Wash issues. An example Global Hot Wash Data Report is given in this appendix.

4. PROCESS.

   a. This appendix defines the RMC Spotlight Presentation, but additional slides may be included for amplification on a conservative basis. The RMCs shall comply with standard formats.

   b. Project Spotlight Chart.

      (1) The left column of the chart shall list all upcoming CNO availabilities for the port within the A-360 window and the next availability to reach A-360 at a minimum.

      (2) The columns for the milestone will be populated and colored in accordance with the following guidelines:

         (a) The top row contains the scheduled milestone date.

         (b) The bottom row is populated with the actual date the milestone was accomplished.

         (c) The top row is colored red/yellow/green (R/Y/G) after the milestone has been accomplished.

            1 Green – milestone met on schedule.

            2 Yellow – milestone 1-7 days late.

            3 Red – milestone >7 days late.

(d) The bottom row is colored with a R/Y/G hash pattern depending upon impact to the next milestone. The bottom row is only colored for accomplished milestones and the follow-on milestone. It may be acceptable to color a future milestone if there exists substantial evidence that it will not be accomplished on time and will have a significant impact on the follow-on milestone.

1 Green hash – next milestone will be met.

2 Yellow hash – moderate risk for next milestone.

3 Red hash – high risk for next milestone.

(3) Comment blocks/balloons may be used to provide amplifying information as necessary.

c. Premium Performance Chart.

(1) The Premium Performance Chart is developed by exported data from NMD to an Access database. Commander, Navy Regional Maintenance Center metrics division is the point of contact for the procedure.

(2) Premium Performance Charts are ordered in the sequence listed on the Project Spotlight Chart.

(3) Comment blocks/balloons may be used to provide amplifying information as necessary.

d. Package Build Chart.

(1) The Package Build Chart is developed with the package build data from NMD. The information is available in the planning side of NMD under planning budget.

(2) Package Build Charts are ordered in the sequence listed on the Project Spotlight Chart.

(3) Comment blocks/balloons may be used to provide amplifying information as necessary.

e. The Hot Wash Status Report is maintained by the RMC Hotwash Coordinator.

f. The Global Hot Wash Data Report is to include the following, at a minimum, for the reporting period in which input is received:

(1) Discussion of best practices.

(2) Discussion of global issues including resolutions.

(3) Premium goal vs. actual (and if exceeded, an explanation as to why).

(4) Identification of premium drivers.

PROJECT SPOTLIGHT CHART

SHIP/HULL	Scheduled CNO Avail Dates (Start/ Compl)	Controls $M (TYCOM/ Program)	Issue HMP/ LOA incl AITs (Sched /Actual)	Task/Fund SID Developmt (Sched/ Actual)	Issue/ Deliver SIDs to NSA for KTRs and AITs (Sched /Actual)	FFP Level Package Locked (Sched/ Actual)	TYCOM and Program Funding Verified (Sched/ Actual)	FFP SHAPEC Package Turnover (Sched/ Actual)	FFP Solicit Bids (Sched/ Actual)	Provide Availability Funding for Modern- ization to RMC	FFP Award (Sched/ Actual)	Actual CNO Avail Dates (Start/ Compl)	Churn Percent (TYCOM/ Program)	Growth & New Work $K (TYCOM/ Program)	Premium Percent (TYCOM/ Program)
			SPM/ NAVSEA/ TYCOM	SPM/NSA/ AIT/TYCOM RMC Mgr	Planning Yard	MT	TYCOM	SHAPEC	RMC	SYSCOMS /PEO/ TYCOM	RMC				
			A-360	A-330	A-180	A-170	A-120	A-135	A-120	A-75	A-60				
DESTROYER	15-Jun-05	$2.9	20-Jun-04	20-Jul-04	17-Dec-04	27-Dec-04	15-Feb-05	31-Jan-05	15-Feb-05	1-Apr-05	16-Apr-05	15-Jun-05	19.8%	$616	15.1%
DDG-XX	7-Sep-05		1-Jun-04	6-Jul-04	1-Dec-04	28-Jan-05	1-Oct-05	16-Feb-05	18-Mar-05	1-Apr-05	11-May-05	7-Sep-05	0.6%	$14	0.2%
CRUISER	2-Feb-06	$8.9	7-Feb-05	9-Mar-05	6-Aug-05	16-Aug-05	5-Oct-05	20-Sep-05	5-Oct-05	19-Nov-05	4-Dec-05				
CG-XX	2-Apr-06		11-Jan-05	7-Dec-04	23-Jun-05	15-Oct-05									

LEGEND

	MILESTONE MET ON SCHEDULE
	MILESTONE 1-7 DAYS LATE
	MILESTONE >7 DAYS LATE
	NEXT MILESTONE WILL BE MET
	MODERATE RISK FOR NEXT MILESTONE
	HIGH RISK FOR NEXT MILESTONE

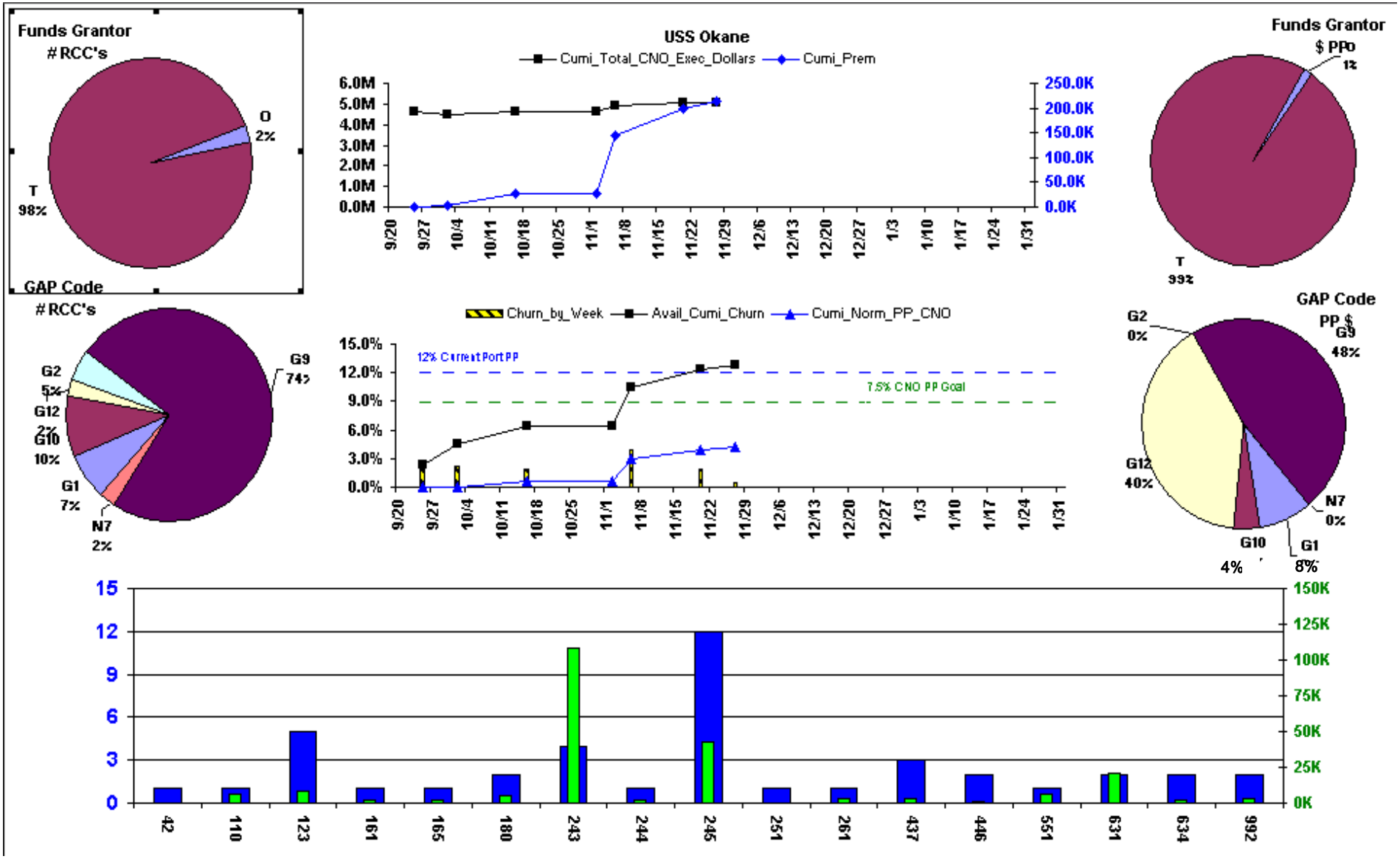
EXPLANATION OF LATE MILESTONE

PROJECT SPOTLIGHT CHART

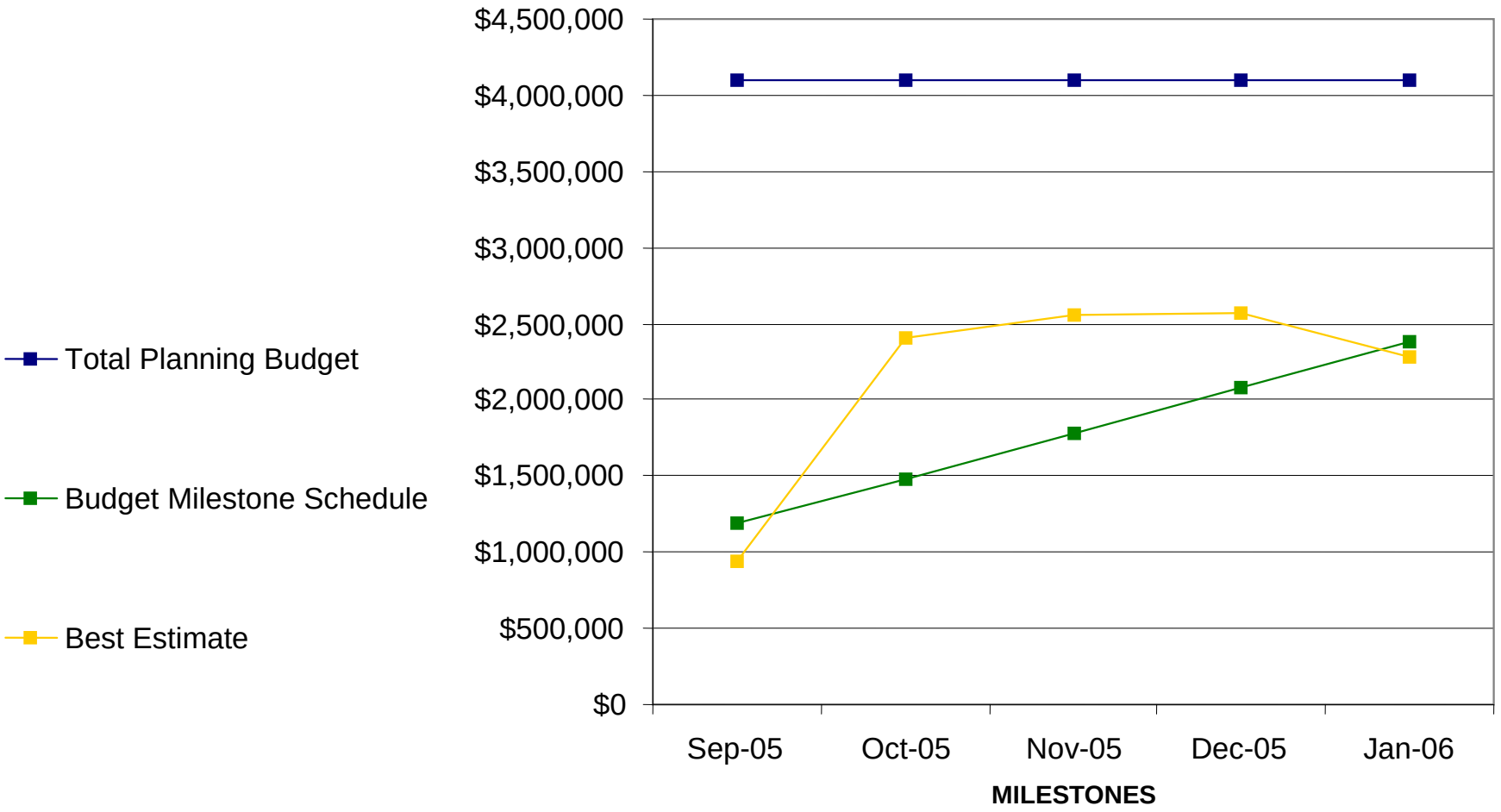
SHIP/HULL	Scheduled CNO Avail Dates (Start/ Compl)	Controls $M (TYCOM/ Program)	Issue HMP/ LOA incl AITs (Sched / Actual)	Task/Fund SID Developmt (Sched/ Actual)	Issue/ Deliver SIDs to NSA for KTRs and AITs (Sched/ Actual)	Provide Avail Funding for Modern. to RMC (Sched/ Actual)	MSMO 100% D-Lvl maint work pkg 2K's locked (Sched /Actual)	MSMO KTR Publish pkg in NMD (Sched/ Actual)	MSMO Definitize Work Package (Sched/ Actual)	Actual CNO Avail Dates (Start/ Compl)	Churn Percent (TYCOM / Program)	Growth & New Work $K (TYCOM/ Program)	Premium Percent (TYCOM/ Program)
			SPM/ NAVSEA/ TYCOM	SPM/NSA/ AIT/TYCOM RMC Mgr	Planning Yard	SYSCOM/ PEO/ TYCOM	MT	MSMO KTR	RMC				
			A-360	A-330	A-180	A-75	A-75	A-60	A-45				

LEGEND	
	MILESTONE MET ON SCHEDULE
	MILESTONE 1-7 DAYS LATE
	MILESTONE >7 DAYS LATE
	NEXT MILESTONE WILL BE MET
	MODERATE RISK FOR NEXT MILESTONE
	HIGH RISK FOR NEXT MILESTONE

Premium Performance Chart

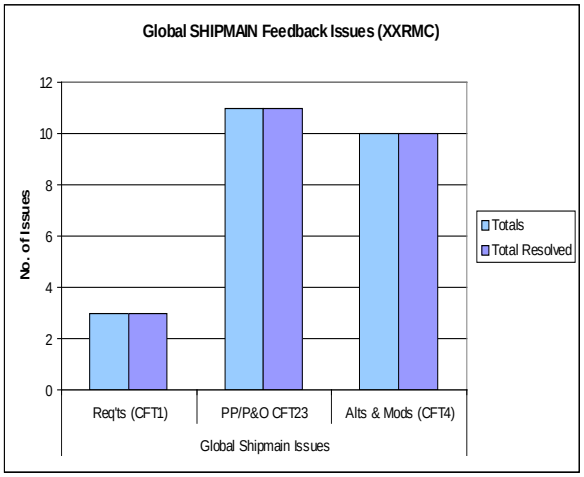


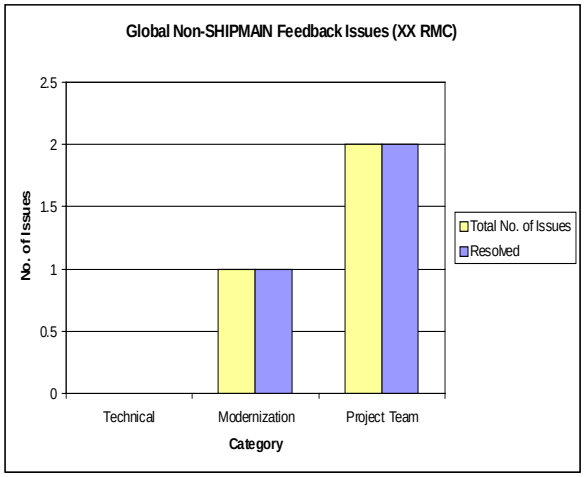
USS CRUISER Package Build Chart
9/05-1/06

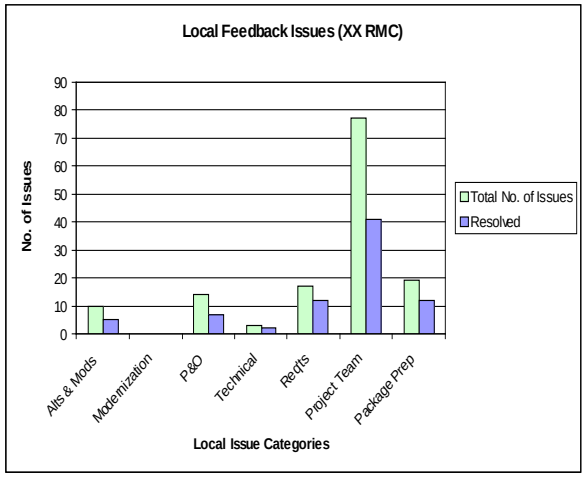


Hot Wash Status Report

HRMC FEEDBACK ISSUE METRICS									
Ship / Hull		USS PORT ROYAL (CG 73)	USS R JAMES (FFG 57)	USS RUSSELL (DDG 59)	USS CROMMELIN (FFG37)	USS SALVOR (ARS 52)	USS HOPPER (DDG 70)	**Totals**	**Total Resolved**
EOA		9/8/04	12/1/04	12/15/04	3/23/05	6/15/05	9/7/05		
HW Mtg Date		10/7/04	1/25/05	1/26/05	3/31/05	7/11/05	9/28/05		
Global Shipmain Issues	**Req'ts (CFT1)**	0	1	2	0	0	0	**3**	**3**
	PP/P&O CFT23	0	1	1	3	4	2	**11**	**11**
	Alts & Mods (CFT4)	1	1	3	0	0	5	**10**	**10**
	Total	**1**	**3**	**6**	**3**	**4**	**7**	**24**	**24**
Global Non-Shipmain Issues	**Technical**	0	0	0	0	0	0	**0**	**0**
	Modernization	0	0	1	0	0	0	**1**	**1**
	Project Team	0	0	0	0	0	2	**2**	**2**
	Total	**0**	**0**	**1**	**0**	**0**	**2**	**3**	**3**
Local Issues	**Alts & Mods**	2	0	0	1	2	5	**10**	**5**
	Modernization	0	0	0	0	0	0	**0**	**0**
	P&O	3	2	1	3	2	3	**14**	**7**
	Technical	0	0	0	0	3	0	**3**	**2**
	Req'ts	5	5	1	2	4	0	**17**	**12**
	Project Team	16	10	8	8	13	22	**77**	**41**
	Package Prep	5	4	2	2	5	1	**19**	**12**
	Total	**31**	**21**	**12**	**16**	**29**	**31**	**140**	**79**







Global Hot Wash Data

Bullets include as a minimum:

- Discussion of best practices.
- Discussion of global issues.
- Premium goal vs. actual
  (and if exceeded, an explanation as to why).
- Identify premium drivers.

VOLUME VI

CHAPTER 32

TOP MANAGEMENT ATTENTION
TOP MANAGEMENT ISSUES

REFERENCES.

(a) OPNAVINST 4700.7 - Maintenance Policy for U.S. Naval Ships
(b) OPNAVINST 3000.12 - Operational Availability of Equipments and Weapons Systems

LISTING OF APPENDICES.

A Top Management Attention and Top Management Issues Flowchart

32.1 PURPOSE. Reference (a) provides Chief of Naval Operations (CNO) Maintenance Policy for U.S. Navy Ships, which includes the Top Management Attention/Top Management Issues (TMA/TMI) program for addressing chronic maintenance problems. Commander, United States Fleet Forces Command (CUSFFC) is tasked with developing and forwarding Hull, Mechanical and Electrical (HM&E) and Combat System (CS) Technical Ticklers to identify common maintenance issues between Fleets. This chapter provides CUSFFC policy, procedures and standardized metrics for selecting systems/equipment for inclusion in the TMA/TMI process.

32.2 BACKGROUND. The TMA/TMI process is the Navy's priority corrective action process for United States Fleet Forces Command, Fleet Commanders, Type Commanders (TYCOM), Systems Commands (SYSCOM) and Office of the CNO (OPNAV) Resource Sponsors. This process is the means to identify top material readiness and cost problems and develop solutions that effectively and efficiently achieve approved levels of performance while realizing near-term returns on investment.

32.3 APPLICABILITY AND SCOPE.

a. The TMA/TMI process encompasses all surface force, aircraft carrier and submarine installed equipment and systems, including aviation-oriented items that are integral parts of the ship. This process supports Navy goals and initiatives that improve fleet material readiness and increase the operational availability of those items that are identified by the fleet as needing primary attention and action. The TMA/TMI process excludes equipment under the responsibility of Director, Strategic Systems Programs and Director of Naval Nuclear Propulsion Program.

b. The TMA/TMI process uses data from diverse sources to:

(1) Objectively identify critical fleet problems that impact material readiness, maintenance cost and manpower/skill requirements, and warrant top-level attention.

(2) Focus management attention and resources needed to correct these problems.

(3) Enhance communication among CNO Resource Sponsors, Fleet Commanders, TYCOMs and Systems Command Program Offices.

(4) Execute the TMA/TMI process in accordance with the TMA/TMI Process Flowchart in Appendix A.

c. The TMA/TMI process is the Navy's priority corrective action process for Fleet Commanders, SYSCOMs and OPNAV Resource Sponsors. This process is the means for the Fleet, OPNAV, and SYSCOMs to identify top material readiness and cost problems and develop solutions that effectively and efficiently achieve approved levels of performance while realizing near-term Returns on Investment (ROI).

d. The TMA candidate selection process uses a variety of sources including Maintenance and Material Management (3-M) data prepared by the TMA/TMI Analysis Center to objectively identify critical fleet HM&E and CS problems that impact material readiness, maintenance cost and manpower/skill

requirements and warrant top-level attention. Fleet and TYCOMs use this data to aid in the selection of their TMA/TMI candidate systems/equipment. Fleet and TYCOMs may also solicit topic input from subordinate Commanders for problems having significant negative impact on readiness.

e. Candidate systems/equipment metrics are forwarded from the TYCOMs to Naval Sea Systems Command (NAVSEA) for inclusion in the TMA process. The candidate selection process is a semi-annual process commencing immediately after TMA Fleet Week and culminating at Mid-Cycle with the nomination of new systems/equipment.

f. TMI topics are selected by the TMA panel from the topics presented at TMA which require flag level attention.

32.4 RESPONSIBILITIES.

32.4.1 Commander, United States Fleet Forces Command. CUSFFC Maintenance Officer (N43) is the Staff Officer responsible for implementation of this chapter and may direct HM&E and CS/equipment be included in the TMA/TMI process.

32.4.1.1 Duties. TYCOM Maintenance Officers shall:

a. Develop TYCOM HM&E and CS Technical Ticklers and identify common issues between ships every six months. Establish a priority ranking of systems based on selected attributes (e.g., man-hours, cost, readiness). Forward TYCOM HM&E and CS Technical Ticklers to Commander, Naval Sea Systems Command (COMNAVSEASYSCOM) 05 for surface force ships. For submarines, provide TMA issues to COMNAVSEASYSCOM 07, with copy to OPNAV Resource Sponsors and other cognizant SYSCOMs as appropriate, via a coordinated/joint cover letter.

b. Coordinate TMI Panel agendas and dates with TMA/TMI Working Group Chair(s).

c. Participate on TMA panels and chair TMI Panels.

d. Chairs the TMI panel at least annually either through established Enterprise Board of Directors meetings or as a separate TMI panel.

e. Coordinate Fleet participation in the TMA and TMI process (TYCOMs and Regional Maintenance Center Supports).

32.4.2 Naval Sea Systems Command. COMNAVSEASYSCOM coordinates overall SYSCOM participation in the TMA. Specifically, (SEA 07) coordinates the efforts for submarine platforms. NAVSEA (05) coordinates efforts for surface and carrier platforms.

32.4.2.1 Duties.

32.4.2.1.1 Commander, Naval Sea Systems Command (05). COMNAVSEASYSCOM (05) for surface force ships and aircraft carriers shall:

a. Form the TMA/TMI Working Groups and Panels and staff with appropriate representatives.

b. Receive and disseminate the TYCOM HM&E and CS/C4I Surface Force Ship Technical Ticklers to the appropriate TMA/TMI Working Groups.

c. Review and forward Plan of Action and Milestones and ROIs, or other technical presentations from TMA/TMI Working Groups to Fleet and TYCOMs.

d. Chair the surface force ships and aircraft carrier TMI Panel and establish the NAVSEA response to Fleet identified TMI issues.

32.4.2.1.2 Commander, Naval Sea Systems Command (07)/Program Executive Officer Submarines. COMNAVSEASYSCOM (07)/Program Executive Officers (PEO) Sub shall:

a. Form the TMA/TMI Working Groups and Panels and staff with appropriate representatives.

b. Receive and disseminate the TYCOM HM&E and Nuclear Planning and Execution System TMA issue letter to the appropriate program offices for action.

c. Review and forward Plan of Action and Milestones, Business Case Analyses or other appropriate technical presentations to Fleet and TYCOMs.

32.4.2.1.3 Commander, Naval Sea Systems Command Program Offices. COMNAVSEASYSCOM Program Offices (and Commander Space and Naval Warfare System Command for subparagraphs b. through f. of this paragraph) shall:

a. Chair TMA Panels in accordance with paragraph 32.4.2.1.5 of this chapter.

b. Participate on TMA and TMI Panels as requested.

c. Develop Plan of Action and Milestones and Business Case Analyses to address TYCOM HM&E and CS Technical Tickler issues.

d. Coordinate other activities as required to determine root causes and develop corrective actions.

e. Review minutes from TMA and TMI Panels and take action as appropriate.

f. Work with TYCOMs for resolution of HM&E and Nuclear Planning and Execution System Technical Issues and Action Items.

32.4.2.1.4 Program Executive Officers and Direct Reporting Program Managers. PEO and Direct Reporting Program Managers shall:

a. Assign representatives to the appropriate TMA/TMI Working Groups.

b. Chair the applicable submarine TMI Panels as described in paragraph 32.4.2.1.5 of this chapter.

c. Review minutes from TMA/TMI Panels and take action as appropriate.

32.4.2.1.5 Top Management Attention/Top Management Issues Panels. The TMA/TMI Panels shall:

a. Review, discuss, and agree on the course of action to resolve each technical issue presented.

b. Publicize minutes of the Panel Meetings.

32.4.2.1.5.1 Top Management Attention Panels. TMA Panels meet every six months, to assess the applicability of Plan of Action and Milestones and ROIs, and monitor the progress of issues. TMA panels are meetings chaired at the O-6 level. In general, TMA Panels discuss those issues that can be handled within the SYSCOM organizations. The TMA Panel will identify top issues based on specific attributes (e.g., man-hours, cost, readiness) for presentation at TMI.

a. TMA Panels: TMA Panel composition and agendas are coordinated between applicable TYCOM staffs, Fleet staffs and SYSCOM Program Offices. Attendees to the appropriate TMA Panels include, but are not limited to, the following:

(1) COMNAVSEASYSCOM (05) representative as chairman for the Surface Force, Aircraft Carrier and CS panels and COMNAVSEASYSCOM (SEA 07) representative as chairman for the Submarine Force panel.

(2) CNO (N43) and applicable Resource Sponsor (N8, N6) representative(s).

(3) Maintenance and Supply representatives from Fleet, TYCOMs, and Regional Maintenance Centers (RMC).

(4) COMNAVSEASYSCOM Program Offices, engineering codes and logistics codes representative(s).

(5) Commander, Space and Naval Warfare Systems Command (COMSPAWARSYSCOM) Program Office representative(s) as requested.

(6) Commander, Naval Air Systems Command (COMNAVAIRSYSCOM) Engineering representative(s) as requested.

(7) In-Service Engineering Agent representatives.

(8) Naval Inventory Control Point (NAVICP) representative.

(9) Training Command representative.

(10) Naval Research Laboratory representative.

(11) Board of Inspection and Survey representative.

b. Submarine Force TMI Panel: The Submarine Force TMI Panel is chaired by COMSUBFOR. The TMI is normally conducted as a part of the Undersea Enterprise Board of Directors meeting. COMSUBFOR and COMSUBPAC Directors for Maintenance and Material Readiness coordinate the agenda with the COMSUBFOR Enterprise office. Panel Members may include, but are not limited to, the following:

(1) COMSUBFOR, SEA 07, PEO SUBS.

(2) CNO (N43) and applicable Resource Sponsor (N8, N6) representative(s).

(3) COMSUBFOR and COMSUBPAC Maintenance and Supply Officers.

(4) COMNAVSEASYSCOM program offices, engineering code and logistics code representatives.

(5) COMSPAWARSYSCOM representative.

(6) COMNAVAIRSYSCOM representative.

(7) In-Service Engineering Agent representative(s).

(8) Commander, Navy Regional Maintenance Center and RMC representatives.

(9) NAVICP representative.

(10) Chief of Naval Education and Training representative.

c. Surface Force Ship/Aircraft Carrier TMI Panel: The Surface Force Ship/Aircraft Carrier TMI Panel is chaired by NAVSEA 05. NAVSEA 05, PEO Theater Surface Combatants, PEO Expeditionary Warfare, PEO Mine and Undersea Warfare, PEO CARRIERS and PEO Surface Strike jointly coordinate the agenda. Attendees of the appropriate TMI Panels include, but are not limited to, the following:

(1) PEO Expeditionary Warfare, PEO Theater Surface Combatants, PEO CARRIERS (Surface/Carrier), PEO Mine and Undersea Warfare, PEO Surface Strike, SEA 07 (Submarine).

(2) CNO (N43), and applicable Resource Sponsor (N8, N6) representative(s).

(3) COMLANTFLT, COMPACFLT, COMNAVSURFLANT, COMNAVSURFPAC, COMNAVAIRLANT, COMNAVAIRPAC, COMSUBLANT, and COMSUBPAC Maintenance and Supply Officers.

(4) COMNAVSEASYSCOM program offices, engineering code and logistics code representatives.

(5) COMSPAWARSYSCOM representative.

(6) COMNAVAIRSYSCOM representative.

(7) In-Service Engineering Agent representative(s).

(8) RMC and RMC representatives.

(9) NAVICP representative.

(10) Chief of Naval Education and Training representative.

(11) Naval Research Laboratory representative.

(12) Board of Inspection and Survey representative.

d. Combat Systems: The CS Troubled Systems Process supports the TMA/TMI process with selected inputs for the COMLANTFLT/COMPACFLT CS Technical Tickler.

32.4.2.1.6 Top Management Attention/Top Management Issues Working Groups. The TMA/TMI Working Groups shall:

a. Receive TYCOM HM&E and CS Technical Ticklers or Issues White Papers as appropriate from NAVSEA 05 for surface force ships/aircraft carriers or from NAVSEA 07 for submarines and identify common and platform specific issues as appropriate.

b. Review TYCOM HM&E and Nuclear Planning and Execution System Technical Ticklers, White Papers or Action Items. Verify applicability of Fleet-recommended actions and achieve agreement with appropriate Fleet and TYCOM staff(s) as appropriate.

c. Notify appropriate COMNAVSEASYSCOM Program Offices and other SYSCOMs when equipment or systems under their care are identified as fleet material readiness issues.

32.4.2.1.7 Review. TMA/TMI Working Groups, comprised of SYSCOM representatives designated by NAVSEA 05 and 07, PEO SUBS, PEO Ships, PEO Integrated Warfare Systems, and PEO CARRIERS, review Fleet inputs to determine common and platform specific issues and assign issues to the appropriate SYSCOM Program Offices.

32.4.3 Top Management Attention/Top Management Issues Analysis Center.

32.4.3.1 Candidate Identification. The TMA/TMI Analysis Center will provide a combined Ranking Matrix to help determine the relative ranking of systems/equipment on a Navy wide basis. The TMA/TMI Analysis Center, using the TYCOM input plus RMC and TYCOM technical experts, will prepare a preliminary set of Fleet generated system problems and potential solutions, the Technical Tickler, for the systems/equipment chosen for inclusion in the TMA/TMI process. The TMA/TMI Analysis Center, using 3-M data, also provides the TYCOMs with a Ranking Matrix, Figures 32-1 and 32-2, and Impact Chart, Figure 32-3, by Allowance Parts List (APL) and Equipment Identification Code (EIC) for their review. The Ranking Matrix will be TYCOM specific, using the Ranking Matrix as a guide, the TYCOMs select systems/equipment for further evaluation and possible induction into the TMA/TMI process.

32.4.3.2 Candidate Expanded Metrics. The TMA/TMI Analysis Center provides the TYCOMs with a tailored TMA Report for their identified systems/equipment. This report contains a Balanced Score Card (BSC), Problem Free Time, Failure Rate, Parts Ranking and modified Ship's Logistics Indicator Computerized Report (SLICR) for the specific candidate system/equipment defined by APL or EIC nominated by the TYCOM. These are 3-M based reports that require no special data collection or analysis efforts.

32.4.4 Type Commanders. The TYCOMs, using the data provided in the TMA Report and other (RMC, SYSCOMs, etc.) Casualty Report (CASREP), maintenance, logistics or training inputs will determine which systems/equipment to nominate for inclusion into the TMA/TMI process. The nomination should include the TMA Metrics plus additional justification including the TYCOM's initial Root Symptom Analysis as to the causes of poor performance. Systems/equipment will be nominated at the lowest component level that can be identified as the reliability or cost driver. When multiple APLs or EICs from the same "System" appear at or near the top of the Ranking Matrix, the entire "System" can be nominated.

32.5 METRICS. Metrics used are generated directly from the 3-M database via Open Architecture Retrieval System (OARS) and require no subsequent data collection or analysis efforts. All Navy systems/equipment that generate maintenance data are included and considered as part of this methodology. This is a three month process, starting after Fleet Week and culminating at the Mid-Cycle review that gets new systems nominated by the Fleet to TMA. Systems not selected for TMA can be re-nominated by a TYCOM Representative at least 4.5 months prior to any future Fleet Week.

32.5.1 Top Management Attention/Top Management Issues Candidate Selection. There are two methods used to select topic candidates for TMA/TMI. TYCOMs may use any combination of the two methods to select topic candidates.

a. The first method entails soliciting fleet commanders, maintenance officers and TYCOM staff members for candidate topics. Candidate topics are then reviewed by both TYCOM maintenance officers and selected or rejected as TMA topics.

b. The second method is by a ranking matrix where costs, man-hours, CASREP volume and other attributes are measured and a "top ten" selection process is then employed.

32.5.1.1 Top Management Attention/Top Management Issues Ranking Matrix Method. Six attributes are used to rank systems/equipment as TMA/TMI Program candidates. Data for five of the attributes are downloaded directly from the 3-M database via OARS. The CASREP Volume data is extracted and sanitized from the NAVICP CASREP Database. The attributes are:

a. 2-Kilo Volume - Total number of Maintenance Actions (2-Kilos) generated by the system/equipment.

b. Man-hours - Total Ship's Force and Intermediate Maintenance Activity (IMA) man-hours expended on system/equipment maintenance.

c. Parts Cost - Total net cost of repair parts used to support the system/equipment.

d. Hi-Priority Failures - Total number of 2-Kilos that are Status 2 or 3 and Priority 1, 2 or 3 2-Kilos generated for a system/equipment.

e. Hi-Priority Down Time - Total days of down time for the system/equipment based on hi-priority failures.

f. CASREP Volume - Number of CASREPs generated by the system/equipment.

Data on each attribute is collected over a two-year period. The Ranking Matrix is a multivariable pareto ranking technique that avoids the distortion inherent in ordinary ranking schemes where variables representing different aspects of a system/equipment may have different units of measurement with widely differing scales. The technique gives full visibility to systems where even only one of the descriptive attributes has a high impact level. As a result the “top ten pareto” of each of the attributes winds up on or near page one of the overall ranking. The process is easily automated in MS Excel or MS Access. This method is applied to approximately 43,000 APL and 4,200 EIC systems/equipment. The resultant Ranking Matrix provides Fleet decision makers a list of potential TMA/TMI candidates.

32.5.1.1.1 Ranking Matrix Calculation. Data for each attribute are scaled/normalized/standardized (depending on the language in your field of study) in a way that creates unit vectors (0 to 1, with a few high outliers > 1) in statistical units (Standard Deviation multiples sometime referred to as “Z” scores). The scaling used results in the 3-sigma value of the data being scaled to equal one. The 99.86^{th} percentile of the data is used to locate that value in the ranked raw data, which is a percentile commonly used for "normal" distributions with a single tail as being equivalent to the 3-sigma value. Although our five attribute distributions are not “normal”, they are close to being “log normal” so the percentile technique works. The percentile technique works well regardless since the data is a 100% sample and the statistical distribution (which should be known if samples are used for estimating) is not a critical issue. After scaling the attributes, the vector equivalents are then combined using vector addition to create a balanced rank value that can be used for final ordering of the ranking. The vector addition technique is straightforward (Pythagorean). For over three years this has produced a tight pattern of the top ten for each attribute falling within the top 50 fleet-wide. The method is objective, repeatable, and robust and uses the “actual data”, not a representation of the data.

Figure 32-1 Sample TMA APL Ranking Matrix

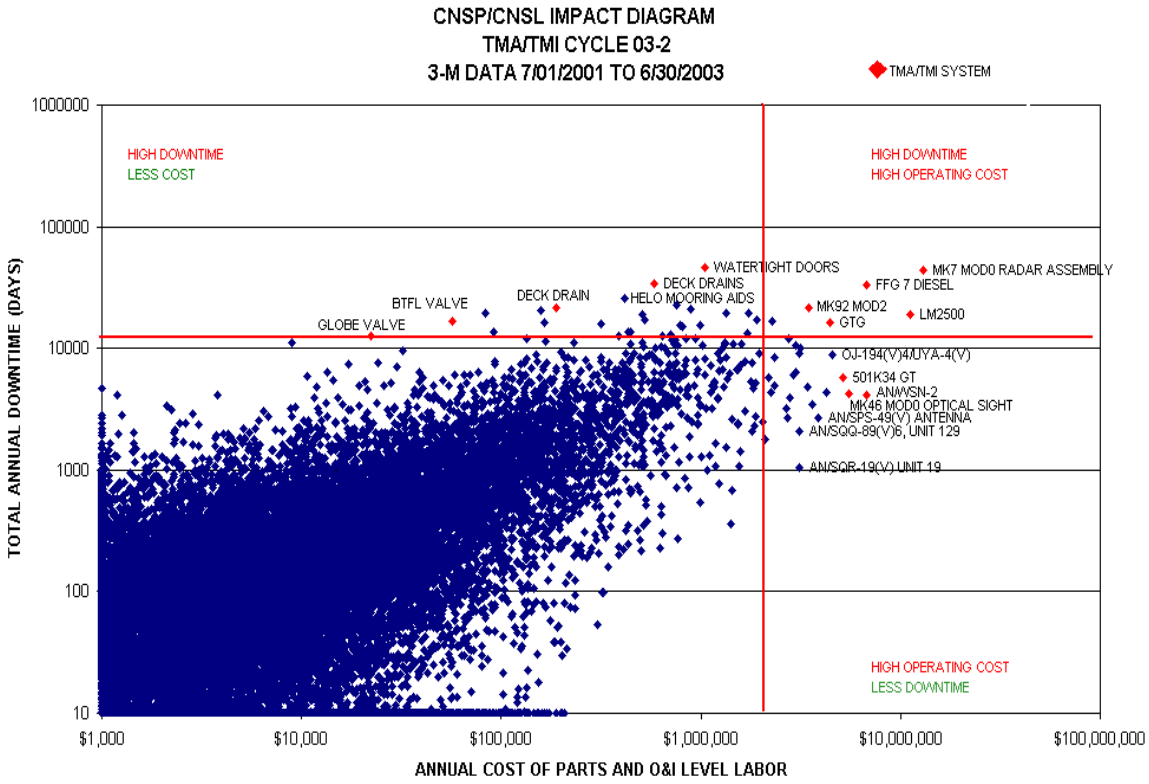
FUNCTIONAL AREA (L1)	EIC	EIC NOMENCLATURE (L2)	APL	APL NOMENCLATURE (L3)	apl_population	jcn_count	jcn_rank	total_man	tmh_rank	total_rep	trrc_rank	hi_priority	hpf_rank	hi_priority	hpfdt_ran	casrep_vc	casrep_ra	BAL_VEC	BAL_RANK	MDT	MTBF	A(o)	R(m)	P(mf)	$/Failure
GUN SYSTEMS	GV	WEAPON SYSTEM, CLOSE-IN, MK 15 (PHALANX)	006090237	MK7MOD0,RADAR ASSEMBLY,MODULE	237	6721	1	172335	3	18716213	1	1463	1	64877.77	2	471	1	17.18	1	44	79	64.0%	10.2%	89.8%	$17,504
GENERATION SYSTEMS, ELECTRIC POWER	37	GENERATOR SYSTEM, 100KW, STEWART AND STEVEI	667780010E	ENGINE DSL 16 1140001 1600 1800RPM	106	3016	2	258700	1	3601167	20	809	2	56992.98	3	122	3	9.71	2	70	64	47.5%	6.0%	94.0%	$17,119
PROPULSION SYSTEM, MAIN GAS TURBINE, MI	D1	GAS TURBINE MODULE, PROPULSION	052050008	GAS GENERATOR ASSY&GTURB MIN PROSN 7LM2500PB1C	137	1794	9	156811	4	15261673	2	456	6	34540.56	9	115	4	8.65	3	76	146	65.9%	29.2%	70.8%	$47,268
GENERATION SYSTEMS, ELECTRIC POWER	35	GENERATOR SET, GAS TURBINE	052090005	ENG ASSY,GAS TURB MDL 501K34	117	1249	27	59905	14	11631984	4	169	32	10109.13	136	76	17	5.69	4	53	301	84.9%	55.0%	45.0%	$74,223
NAVIGATION SYSTEMS (ELECTRONIC AND NON	LB	GYROCOMPASS (CIRCUIT LC AND XLC)	282000010	ANAWSN-2 SET,GYROCOMPASS,STABLIZED	62	242	446	5592	699	12665477	3	72	238	4621.532	508	36	68	5.48	5	67	419	86.2%	65.1%	34.9%	$179,016
GUN SYSTEMS	GV	WEAPON SYSTEM, CLOSE-IN, MK 15 (PHALANX)	006090238	MK20MOD0,ELECTRONIC ASSEMBLY,ENCLOSURE	237	2019	8	52239	21	4026699	17	462	5	18463.1	38	143	2	5.02	6	38	239	86.2%	47.2%	52.8%	$12,687
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	78298233SA	CJ-194(V)4/UYA-4(V) LESS IP-1091	192	595	103	178318	2	1469130	73	144	63	6989.946	277	14	268	4.95	7	49	649	93.0%	75.8%	24.2%	$59,735
MISSILE SYSTEMS, SURFACE	51	FIRE CONTROL SYSTEM, GUN/MISSILE, MK 92 MOD 2	006080059	MK92MOD2,FIRE CONTROL SYSTEM (BASELINE)	18	1360	18	34045	47	4320047	14	579	3	35400.09	8	97	7	4.88	8	61	15	19.8%	0.0%	100.0%	$9,813
HULL STRUCTURE	AD	DOORS, HATCHES, MANHOLES, SCUTTLES AND CLOS	319990011	WATERTIGHT DOORS, HATCHES, SCUTTLES NO OTHER AP	3364	2057	6	36801	38	202909	537	243	20	75146.63	1	1	3073	4.77	9	309	6741	95.6%	97.4%	2.6%	$6,891
GUN SYSTEMS	G6	WEAPON SYSTEMS, GUN	006040508	MK46MOD0,OPTICAL SIGHT	34	246	434	15632	180	10663899	5	79	195	6291.344	335	58	27	4.76	10	80	210	72.5%	42.4%	57.6%	$143,154
AUXILIARY SYSTEMS	TF	AIR SYSTEMS, COMPRESSED	061430285E	COMPRESSOR AIR HIGH PRESSURE 200FH 3000PSI	57	1299	23	61519	13	1947861	47	520	4	26820.26	13	88	9	4.35	11	55	53	49.1%	3.4%	96.6%	$8,478
GENERATION SYSTEMS, ELECTRIC POWER	31	PLANTS, GENERATING, SHIPS SERVICE	052090002	ENGINE GAS TURBINE SHIPS SER GEN	78	1297	24	81095	5	4969783	11	317	13	12899.61	83	85	10	4.16	12	41	120	74.6%	22.3%	77.7%	$25,910
PROPULSION SYSTEM, MAIN GAS TURBINE, MI	D1	GAS TURBINE MODULE, PROPULSION	052050018	GAS GENRATOR ASSEMBLY MDL L25250G12	66	664	88	41219	33	8613557	6	160	50	11454.33	107	42	56	4.12	13	72	201	73.7%	40.8%	59.2%	$64,139
COMMUNICATION AND DATA SYSTEMS	QF	CRYPTOGRAPHIC EQUIPMENT	88633651	TA-970/U, TELEPHONE SET	4786	2832	3	17869	141	462109	220	427	7	21860.75	29	0	5983	3.77	14	51	5457	99.1%	96.8%	3.2%	$2,802
DISTRIBUTION SYSTEMS, ELECTRICAL POWER	45	DISTRIBUTION SYSTEM, AC LIGHTING	249990001	FIXTURE LGTG FLRSNT MS17179-77.4	108040	2549	4	44648	29	927524	105	369	10	25459.73	21	0	5979	3.61	15	71	147690	100.0%	99.9%	0.1%	$7,558
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	ME015664	AM-6900/SPY-1A CG47T68, AMPLIFIER,RADIO FREQ	48	1151	32	72676	9	4080218	15	336	12	13133.13	79	19	169	3.45	16	40	72	64.0%	8.1%	91.9%	$21,433
GENERATION SYSTEMS, ELECTRIC POWER	31	PLANTS, GENERATING, SHIPS SERVICE	668880044L	ENGINE DIESEL GEN. 36SS6V-AM MDL 2894F01-GEN 6CY	36	1490	14	36978	37	3982757	19	237	21	14665.93	62	92	8	3.42	17	62	74	54.5%	8.8%	91.2%	$23,046
DISTRIBUTION SYSTEMS, ELECTRICAL POWER	45	DISTRIBUTION SYSTEM, AC LIGHTING	249990138	LANTERN ELEC 115/VAC SYM 101.2	71182	2221	5	31077	57	326997	343	395	9	23916.33	25	2	1982	3.39	18	61	87745	99.9%	99.8%	0.2%	$3,972
PROPULSION SYSTEM, MAIN DIESEL, MECHAN	B1	ENGINE AND CONTROLS, DIESEL	668880032L	ENGINE DIESEL 36SS6V-AM MDL 2894F01 6CYL	48	1538	13	36021	41	4013172	18	179	36	15643	55	80	14	3.20	19	87	131	59.9%	25.2%	74.8%	$30,469
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	ME403291	AM-7158/SPY-1B DDG51T90, AMPLIFIER,RADIO FREQ	120	833	62	16663	162	6526864	8	166	52	3220.242	910	46	41	3.19	20	21	375	94.8%	61.8%	38.2%	$46,079
ADMINISTRATION HABITABILITY, OUTFIT/FURNIS	1A	EQUIPMENT AND FURNISHINGS, UTILITY SPACE	439990247	PLASTIC PROCESSOR MELT UNIT 593-6961200	390	1064	40	46175	26	1046398	91	269	17	28669.29	14	71	19	3.04	21	110	733	86.9%	78.2%	21.8%	$11,168
RADAR AND IFF SYSTEMS	P3	RADAR, AIR SEARCH	59226806	AS-3263/SPS-49(V), ANTENNA	77	240	450	8609	431	6943212	7	47	435	3554.825	796	24	127	3.03	22	76	798	91.3%	79.8%	20.2%	$154,970
RADAR AND IFF SYSTEMS	P1	RADAR, SURFACE SEARCH	57041000	AN/SPS-55, RADAR SET	81	813	64	17709	145	2216016	38	219	25	13163.65	78	112	5	2.98	23	60	180	75.0%	36.8%	63.2%	$13,353
AUXILIARY SYSTEMS	TF	AIR SYSTEMS, COMPRESSED	061430287	COMPRESSOR UNIT 20.0CFH 3000PSI	36	736	75	51315	24	1446433	74	253	19	30980.66	11	55	29	2.96	24	122	69	36.1%	7.4%	92.6%	$13,830
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	ME015669	AM-6899/SPY-1A CG47T68, AMPLIFIER,RADIO FREQ	72	719	79	77050	8	3496322	21	201	29	6048.992	356	24	125	2.92	25	30	174	85.3%	35.6%	64.4%	$32,738
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	ME403311	T-1349/SPG DDG51T90, TRANSMITTER,RADAR	120	940	52	24141	84	5475373	9	132	78	4160.215	624	55	31	2.91	26	32	443	93.4%	66.6%	33.4%	$48,796
GUN SYSTEMS	GV	WEAPON SYSTEM, CLOSE-IN, MK 15 (PHALANX)	006090242	M61A1 20MM GUN	237	1409	16	61981	12	2626318	29	222	24	8212.5	210	43	50	2.90	27	37	520	93.4%	70.7%	29.3%	$23,899
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	ME403292	AM-7159/SPY-1B DDG51T90, AMPLIFIER,RADIO FREQ	80	1088	35	18087	137	5223654	10	176	39	3551.882	797	43	54	2.83	28	20	221	91.6%	44.3%	55.7%	$33,790
PROPULSION SYSTEM, MAIN DIESEL, MECHAN	B1	ENGINE AND CONTROLS, DIESEL	668880067M	ENGINE DSL ID36SS8V-AM MDL-2949F01 8 CYL	24	1167	31	36619	44	1634152	52	167	43	11568.15	106	98	6	2.82	29	69	70	50.3%	7.6%	92.4%	$19,514
GENERATION SYSTEMS, ELECTRIC POWER	31	PLANTS, GENERATING, SHIPS SERVICE	L666360269	DIESEL ENG MDL 38ND8 1-8 12 CYL	32	962	50	79314	7	800932	121	162	47	19018.27	35	39	60	2.82	30	117	96	45.0%	15.4%	84.6%	$24,528
COMMUNICATION AND DATA SYSTEMS	QE	TRANSMITTERS (COMMUNICATION)	00008485	AM-3924D(P)/URT, AMPLIFIER,RADIO FREQUENCY	434	1329	20	17252	149	1646025	64	354	11	16015.65	53	48	37	2.80	31	45	597	93.0%	74.0%	26.0%	$6,696
AUXILIARY SYSTEMS	TF	AIR SYSTEMS, COMPRESSED	883050754	H.P. AIR SYSTEM CARTRIDGE VALVE REPAIR PARTS	119	1280	25	18287	135	62060	1741	405	8	17610.27	45	2	1984	2.77	32	43	143	76.7%	28.4%	71.6%	$1,959
MISSILE SYSTEMS, SURFACE	53	FIRE CONTROL SYSTEMS, GUN/MISSILE	006080067	MK92MOD6,FIRE CONTROL SYSTEM (BASELINE)	12	679	85	19143	125	4687678	13	161	49	18615.98	36	51	33	2.72	33	116	36	23.9%	0.7%	99.3%	$33,251
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	00034338	CJ-451(V)9/UYQ-21(V), ROLL-UP	465	1677	12	31517	54	1920930	48	268	16	9851.075	145	16	223	2.54	34	37	845	95.8%	80.8%	19.2%	$11,872
PROPULSION SYSTEM, MAIN GAS TURBINE, MI	D1	GAS TURBINE MODULE, PROPULSION	059970003	BASSE ENCL & GTRB ASSEMBLY FFG 7 L2504G01	60	890	58	27353	69	681950	151	292	14	25721.71	19	26	106	2.48	35	88	100	53.2%	16.5%	83.5%	$6,082
AUXILIARY SYSTEMS	T7	PLUMBING INSTALLATIONS	017000043	PUMP CTFGL 100GPM 30PSI 1750RPM MCC VLT	231	466	167	28432	64	209336	527	134	77	39702.56	5	25	116	2.48	36	296	839	73.9%	80.7%	19.3%	$10,049
MISSILE SYSTEMS, SURFACE	54	LAUNCHING SYSTEM, GUIDED MISSILE, MK 13 MOD 4	004020385	MK13MOD4,LAUNCHING SYSTEM,GUIDED MISSILE	30	1011	44	36101	40	936992	104	167	34	25403.8	22	44	46	2.39	37	136	78	36.5%	10.0%	90.0%	$12,733
AUXILIARY SYSTEMS	TC	SCUPPERS AND DECK DRAINS	679990055	DRAIN DK SZ 2.000 IN	7370	792	67	9984	368	113662	1004	177	38	35907.37	6	0	5975	2.30	38	203	20274	99.0%	99.1%	0.9%	$2,899
COMMUNICATION AND DATA SYSTEMS	Q7	AMPLIFIERS, AUDIO	00023028	AM-3729/SR, AMPLIFIER,AUDIO FREQ	7333	1739	10	10073	365	329365	338	160	51	26033.9	23	0	5980	2.30	39	156	22316	99.3%	99.2%	0.8%	$4,577
AUXILIARY SYSTEMS	TD	FILLING, VENT AND TRANSFER SYSTEM (FUEL AND OI	882049342A	VALVE GATE 6.00IPS FLGE STL	248	46	2918	1660	2344	2167	12573	36	641	42575.46	4	0	5974	2.30	40	1183	3354	73.9%	94.8%	5.2%	$1,905
SONAR SYSTEMS	R4	SONAR SYSTEMS, CLASSIFICATION	00030785	TB-30C/SQQ-32(V), TOWED BODY	26	529	122	16155	170	2910221	28	122	93	6087.268	350	81	13	2.30	41	50	104	67.5%	17.6%	82.4%	$29,151
GUN SYSTEMS	GV	WEAPON SYSTEM, CLOSE-IN, MK 15 (PHALANX)	006090222	MK15MOD12,WEAPON SYSTEM,CLOSE-IN	113	1020	43	25802	73	1397838	75	148	57	7345.134	255	80	16	2.29	42	50	372	88.2%	61.6%	38.4%	$16,418
GUN SYSTEMS	G3	FIRE CONTROL SYSTEM, GUN, MK 86	49402746	AN/SPQ-9A,RADAR SET	37	490	147	26400	72	1814938	55	145	62	10138.56	135	84	11	2.28	43	70	124	64.0%	23.5%	76.5%	$19,800
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	00030000	CJ-663(V)1/UYQ-21(V), CONSOLE,COMBAT DISPLAY	318	1420	15	18517	132	1722120	58	224	23	11739.85	103	37	66	2.25	44	52	691	93.0%	77.1%	22.9%	$10,995
AUXILIARY SYSTEMS	T1	HEATING SYSTEMS	021450091	WASTE HEAT BOILER MDL BWCC 150 PSIG FWT 180 F	69	927	54	52533	19	380427	263	147	59	21458.47	30	23	131	2.23	45	146	229	61.0%	45.5%	54.5%	$16,883
AUXILIARY SYSTEMS	TK	DISTILLING PLANTS	080030866E	DISTILLATION UNIT 4000GPD	52	561	113	36969	42	410971	261	255	18	20593.06	31	31	84	2.21	46	81	99	55.1%	16.3%	83.7%	$7,252
COMMUNICATION AND DATA SYSTEMS	QP	COMMUNICATION SYSTEMS, SATELLITE	00019597	RT-1107(V)7/WSC-3, RECEIVER TRANSMTR,LOS	1721	1241	28	12220	272	898647	106	263	15	13122.34	80	20	156	2.18	47	46	2961	98.5%	94.1%	5.9%	$4,903
PROPULSION SYSTEM, MAIN GAS TURBINE, MI	D1	GAS TURBINE MODULE, PROPULSION	345030003	STARTER ENG AIR GTRB MDL ATS100-388B	372	553	115	68835	10	2062214	41	82	187	4386.868	575	5	873	2.18	48	53	2209	97.6%	92.2%	7.8%	$58,971
PROPULSION SYSTEM, MAIN GAS TURBINE, MI	D7	OIL SYSTEMS, FUEL	487140001	FILTER SEP LIQFL MDL 50471151500	4	46	2888	80683	6	46448	2166	7	3879	267.4866	9649	0	12281	2.17	49	41	278	87.1%	52.4%	47.6%	$467,967

Figure 32-2 Sample TMA EIC Ranking Matrix

EIC	EIC NOMENCLATURE	FUNCTIONAL AREA	jcn_count	jcn_rank	an_hours	tmh_rank	total_repair	trrc_rank	hi_priority	hpf_rank	hi_priority	hpdt_rank	casrep_vc	casrep_ra	BAL_VEC	BAL_RANK
U000	SUPPORT SERVICES, MAINTENANCE	SUPPORT SERVICES, MAINTENANCE	183,743	1	6,132,518	1	$25,751,114	4	17905	1	4,046,753	1	421	7	41.99	1
1000	ADMINISTRATION HABITABILITY, OUTFIT/FURNISHINGS	ADMINISTRATION HABITABILITY, OUTFIT/FUR	40,913	3	1,333,477	4	$5,812,668	37	6085	2	1,374,829	2	24	282	11.50	2
A905	COMPARTMENTS	HULL STRUCTURE	56,132	2	1,575,477	3	$2,220,421	100	4103	6	1,086,529	3	15	421	11.44	3
Z000	SPECIAL/MISCELLANEOUS/UNCODED ITEMS	SPECIAL/MISCELLANEOUS/UNCODED ITEMS	27,685	5	1,633,924	2	$37,860,095	3	2988	10	410,674	10	73	95	9.45	4
AD01	DOORS	HULL STRUCTURE	40,661	4	712,558	7	$7,877,630	21	4198	5	870,775	4	95	69	8.23	5
T801	FIREMAINS	AUXILIARY SYSTEMS	19,247	12	591,128	8	$10,819,978	16	4390	4	815,003	5	637	1	7.72	6
1805	LOCKERS, DAMAGE CONTROL	ADMINISTRATION HABITABILITY, OUTFIT/FUR	24,547	6	728,980	6	$13,264,377	11	4912	3	612,214	6	20	332	6.59	7
D111	GENERATOR ASSEMBLY, GAS	PROPULSION SYSTEM, MAIN GAS TURBINE	7,361	38	474,096	11	$38,386,681	2	1679	25	117,104	46	308	10	6.38	8
5612	TRANSMITTER GROUPS (AN/SPY-1)	MISSILE SYSTEMS, SURFACE	9,923	21	320,727	23	$38,454,563	1	1700	23	64,308	84	276	13	6.23	9
3108	GENERATOR SET, 60HZ, GAS TURBINE DRIVEN	GENERATION SYSTEMS, ELECTRIC POWER	11,571	15	883,518	5	$16,253,348	6	2847	11	169,960	28	563	3	5.92	10
TF01	AIR SYSTEMS, HIGH PRESSURE	AUXILIARY SYSTEMS	20,573	9	461,414	13	$12,792,343	13	3851	7	371,861	12	501	4	5.78	11
TF03	AIR SYSTEMS, LOW AND MEDIUM PRESSURE	AUXILIARY SYSTEMS	18,272	13	522,940	10	$13,197,387	12	3340	9	295,402	17	563	2	5.69	12
1B01	GALLEY EQUIPMENT (COMMISSARY SPACES)	ADMINISTRATION HABITABILITY, OUTFIT/FUR	23,144	7	354,346	21	$4,608,712	44	3544	8	423,713	9	92	72	4.71	13
T30B	FAN UNIT (TYPE A, VANEAXIAL)	AUXILIARY SYSTEMS	8,689	24	234,068	34	$2,091,720	104	2330	14	470,081	8	353	9	4.09	14
B101	ENGINE, DIESEL	PROPULSION SYSTEM, MAIN DIESEL, MECH	9,587	22	273,377	28	$12,351,988	14	1554	29	134,713	37	458	6	3.91	15
T40S	CONDITIONING SYS, AIR (R-114 CHILLED WATER PLANT)	AUXILIARY SYSTEMS	12,995	14	365,132	19	$5,967,372	36	2415	13	366,808	13	204	21	3.73	16
4505	FIXTURES, LIGHTING, PERMANENT MOUNTED	DISTRIBUTION SYSTEMS, ELECTRICAL POW	20,131	10	362,859	20	$4,937,186	42	2703	12	246,527	20	8	625	3.70	17
T706	PIPING AND VALVE GROUP	AUXILIARY SYSTEMS	10,537	18	262,186	30	$3,130,625	68	1995	17	496,523	7	64	105	3.64	18
7C1C	AIRCRAFT RECOVERY EQUIPMENT GENERAL ARRANGEMENT, MK 7	AVIATION SHIP INSTALLATION	21,233	8	461,127	14	$10,376,460	17	185	228	69,568	76	21	318	3.51	19
7A11	CATAPULT GENERAL ARRANGEMENT C13/C13-1/C13-2	AVIATION SHIP INSTALLATION	19,771	11	582,583	9	$6,842,689	29	410	112	67,447	78	18	357	3.45	20
T806	AUXILIARY SEA WATER SERVICE SYSTEM	AUXILIARY SYSTEMS	11,020	17	403,072	17	$6,673,045	31	2106	16	269,111	19	231	17	3.39	21
3701	GENERATOR SET, 60HZ, DIESEL ENGINE DRIVEN	GENERATION SYSTEMS, ELECTRIC POWER	8,594	26	448,990	15	$6,189,991	35	2212	15	161,341	31	286	12	3.29	22
3101	GENERATOR SET, 60HZ, DIESEL ENGINE DRIVEN	GENERATION SYSTEMS, ELECTRIC POWER	8,673	25	267,790	29	$9,680,634	19	1249	32	99,833	52	373	8	3.23	23
GV23	RADAR-WEAPON ASSEMBLY 5543003	GUN SYSTEMS	7,264	40	186,791	41	$18,210,968	5	1363	31	67,058	80	172	26	3.23	24
GV00	WEAPON SYSTEM, CLOSE-IN, MK 15 (PHALANX)	GUN SYSTEMS	1,846	140	55,909	134	$3,197,582	67	442	104	33,195	175	484	5	3.06	25
T300	VENTILATION SYSTEMS	AUXILIARY SYSTEMS	8,557	27	170,682	43	$2,095,440	103	1742	22	393,807	11	162	29	3.05	26
T404	AIR CONDITIONING PLANT, CHILLED WATER (R-12) 80 TON	AUXILIARY SYSTEMS	7,601	34	212,030	36	$3,455,803	61	1974	18	312,106	16	220	19	2.94	27
A500	PLATFORMS, FLATS AND DECKS	HULL STRUCTURE	10,495	19	315,058	24	$722,116	251	1631	26	335,634	14	15	422	2.85	28
F101	BOILERS, D-EXPRESS-HEADER TYPE, PRPLN SYS, MAIN STEAM	PROPULSION SYSTEM, MAIN-STEAM, MECH	7,402	37	437,143	16	$5,179,471	38	1682	24	226,238	21	162	30	2.83	29
T605	FUELING SERV, XFR AND BLENDING SYSTEM, AVI JP-5	AUXILIARY SYSTEMS	9,470	23	273,973	27	$5,055,032	39	1808	20	315,318	15	74	93	2.83	30
TB03	WATER SYSTEM, POTABLE	AUXILIARY SYSTEMS	10,434	20	277,612	26	$6,619,149	32	1825	19	209,837	25	158	32	2.74	31
TK03	DISTILLING PLANT, LOW PRESSURE FLASH TYPE	AUXILIARY SYSTEMS	7,702	33	258,056	31	$6,879,203	27	1746	21	195,523	26	222	18	2.70	32
D701	SERVICE SYSTEM, FUEL OIL	PROPULSION SYSTEM, MAIN GAS TURBINE	7,520	35	399,221	18	$7,374,117	23	1596	27	132,404	40	192	24	2.70	33
5646	AN/SPG-62(SERIES), RADAR SET	MISSILE SYSTEMS, SURFACE	5,414	49	111,779	69	$14,534,374	8	751	57	38,609	147	217	20	2.69	34
GV20	WEAPON SYSTEMS, CLOSE-IN, MK 15 MODS 11-14 (PHALANX)	GUN SYSTEMS	8,108	29	180,214	42	$10,197,047	18	1166	38	56,343	99	272	14	2.68	35
5622	DISPLAY GROUP, COMMAND AND DECISION	MISSILE SYSTEMS, SURFACE	6,938	43	462,580	12	$6,948,534	25	1224	33	64,784	83	108	58	2.44	36
1A01	LAUNDRY-TAILOR SHOP EQUIPMENT	ADMINISTRATION HABITABILITY, OUTFIT/FUR	11,420	16	204,488	38	$2,314,806	94	1577	28	209,992	24	68	99	2.33	37
LB3E	AN/WSN-2, GYROCOMPASS SET, STABILIZED	NAVIGATION SYSTEMS (ELECTRONIC AND N	436	475	8,766	560	$15,594,245	7	123	352	9,553	456	44	165	2.30	38
4101	SWITCHBOARD, SHIPS SERVICE, 60HZ	DISTRIBUTION SYSTEMS, ELECTRICAL POW	5,106	51	152,708	47	$4,080,244	49	1097	41	102,675	51	295	11	2.29	39
G611	WEAPON SYSTEM, GUN, MK 34 MOD 0	GUN SYSTEMS	2,675	104	68,606	116	$13,525,878	10	355	132	25,221	218	148	36	2.23	40

32.5.1.2 Impact Chart. The Impact Chart provides a means of plotting the Ranking Matrix and showing, using a two-axis display, the TMA/TMI systems/equipment and potential candidate systems/equipment. Annual Cost of Parts and Labor are combined to form the X-axis and Days Down Time the Y-axis, providing a visual "high cost", "high down time" display of TMA/TMI current and candidate systems/equipment.

Figure 32-3 Sample Impact Diagram



32.5.1.3 Balanced Score Card.

a. Ratio analysis is a valuable tool for interpreting financial and operating data (from balance sheets, profit-and-loss statements, production data, etc.) to detect favorable or unfavorable conditions in business performance.

b. Ratios are used to show the proportional relationship of data from a variety of sources. Business owners should compare their ratios for a specific period with previous periods to ascertain possible reasons for change. They may also choose to compare the ratios for their operation with the industry standard.

c. After an operation has been in existence for a reasonable time, the ratios tend to stabilize and in many industries desirable ratios are well established. Therefore, there is a minimum percentage that an operation can cost (manpower/capital) and still provide proper service, and a maximum that it can cost before the operation is shut down or re-engineered.

d. This business approach can be applied to the management of systems in the fleet. The BSC developed by the TMA/TMI Analysis Center allows the user to:

(1) Observe the shape, or system behavior/maintenance strategy (relative proportions or ratios, variable to variable).

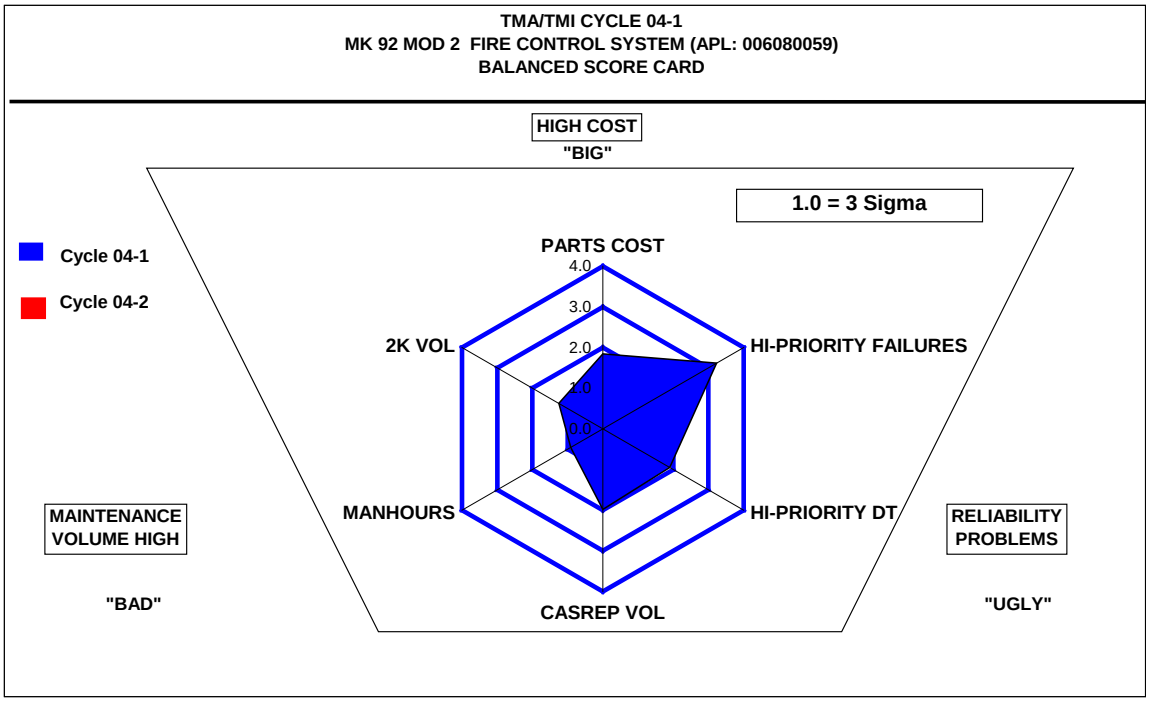
(2) Compare a single variable with the entire fleet (since the data is scaled using the upper control limit of all fleet data for each variable as the 100% mark).

(3) Observe the enclosed area which is proportional to the TMA/TMI balanced ranking value.

(4) Identify problem areas for follow-on analysis.

Notice that ratios of variables that have the same value on the grid (1:1) are at the fleet average or norm. For example, if Hi-Priority Failures and Hi-Priority Downtime are equal, the connecting line is parallel to the grid and that system has an Average Logistics Response Time equal to the fleet average. Other ratios behave in the same way. A typical BSC has six sides representing the six TMA/TMI attributes. Additional variables from other data sources may be added and, if scaled to the upper control limit of that data source, will achieve similar results.

Figure 32-4 Sample BSC



32.5.1.4 Time (problem free). Reference (b), establishes Operational Availability (Ao) as the primary measure of material readiness for navy mission-essential systems, subsystems and equipment installed in platforms. Ao represents the expected percentage of time that system or individual equipment will be ready to perform satisfactorily in an operating environment when called for at any random point in time. To provide the primary measure of material readiness for the TMA/TMI systems/equipment, the TMA/TMI Analysis Center has developed a measure of Ao for selecting, tracking and trending TMA/TMI systems/equipment called Time Problem Free (T (pf)).

a. T (pf) uses the mathematical description of Ao provided by reference (b). Generally, Ao is interpreted as the percentage of time that the system will be ready to perform satisfactorily in an operating environment. T (pf) is interpreted as the percentage of time that the system or equipment is free of hi-priority failures during that same period. Quantitatively, this is expressed in the formula:

Ao = Uptime/Uptime + Downtime

For the purposes of describing TMA/TMI systems/equipment, Uptime is equal to Mean Time Between Failure (MTBF) and Downtime is equal to Mean Down Time (MDT). The TMA/TMI formula for T (pf) becomes:

T (pf) = MTBF/(MTBF + MDT)

Data to calculate T (pf) is extracted from the Navy's 3-M Database via the OARS. OARS provides a ten-year maintenance history of system/equipment performance.

MTBF (in days) is calculated using the formula:

MTBF = 1/(No. Failures/(30.44*0.667*Population)) where

b. No. Failures = the number of Status 2 and 3 2-Kilos written per month. Status 2 is defined by 3-M as inoperative and Status 3 is degraded performance. Limiting 2-Kilo data to Status 2 and 3 eliminates approximately 75% of all 2-Kilos written and provides the basis for measuring mission degrading performance. Together the TMA/TMI process identifies these as "Deck Plate" CASREPs or maintenance actions that reduce a system or equipment's ability to satisfactorily perform in an operating environment. 30.44*0.667 = 30.44 days in an average month times 0.667, which is defined by reference (b) as "the percentage of time that the system will be ready to perform satisfactorily in an operating environment". For sea-going systems this operating tempo is approximated as 2/3-calendar time.

c. Population = the actual population of the system/equipment under evaluation or the number of platforms the system/equipment is installed in. Actual numbers of equipment is generally used for CS and larger HM&E items such as Main Engines or Ships Service Generators. Number of platforms is used for multiple installations of smaller HM&E items such as pumps or valves.

d. MDT is computed by month directly from OARS and is the mean number of days from the opening of Status 2 or 3 2-Kilos until the Deck Plate CASREPs are corrected and the 2-Kilos closed. MDT is all-inclusive. It contains such items as Mean Logistics Delay Time, Administrative Time, Mean Total Time to Repair, etc. Breaking MDT down into the contributing elements requires expensive data collection and analysis and is not necessary for TMA/TMI purposes.

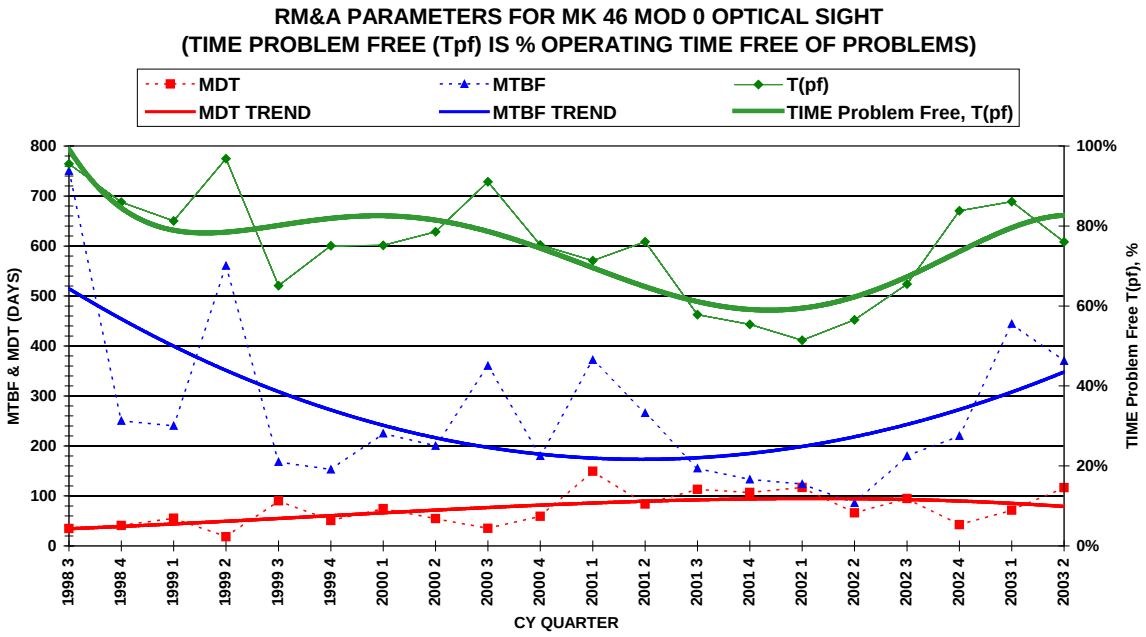
32.5.1.4.1 Time (problem free) Assessment. The resultant T (pf) meets the requirements of reference (b) and provides a means of assessing:

a. Operational Availability of TMA/TMI systems/equipment.

b. Effectiveness of the TMA/TMI program in resolving chronic problems in those systems/equipment.

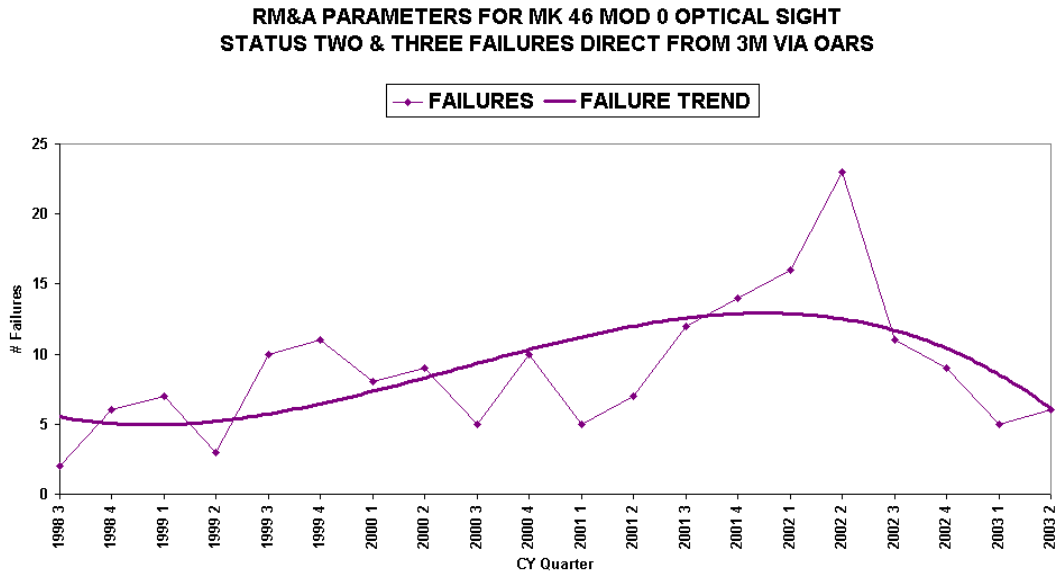
c. Systems/equipment trends in T (pf), MTBF and MDT over time.

Figure 32-5 Sample T(pf)



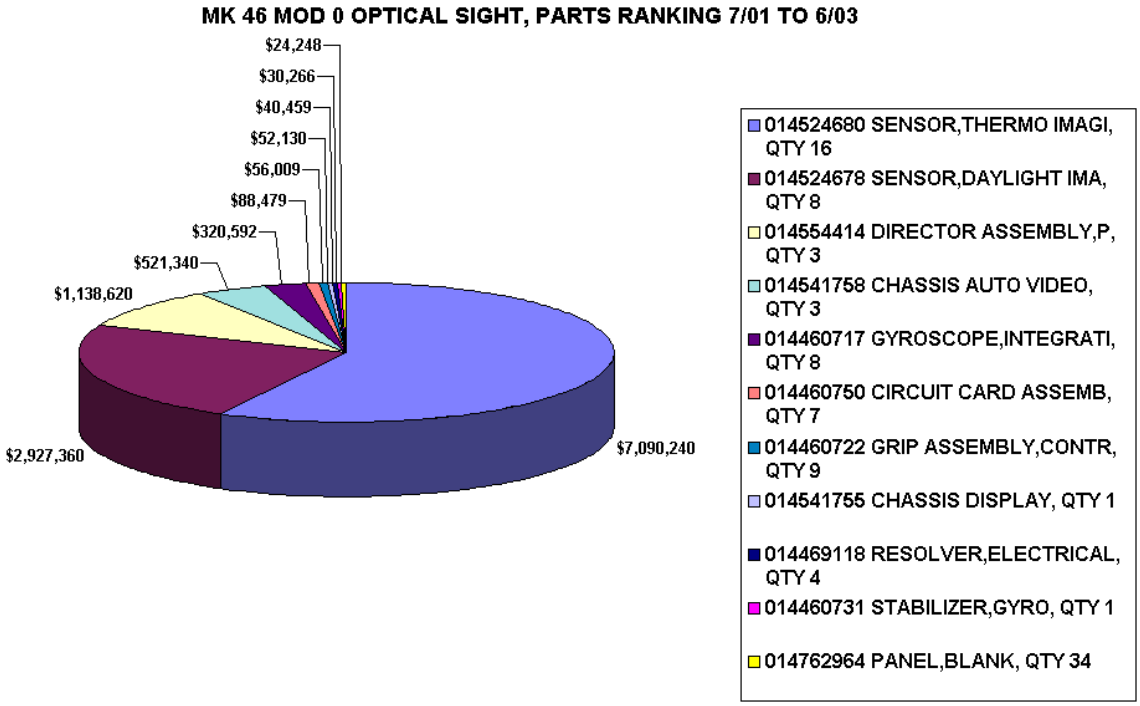
32.5.1.5 Failure Trend. The failure trend provides a failure history for the candidate TMA/TMI system/equipment. Hi-Priority Failures are plotted quarterly for the past five years and a polynomial trend line provides the direction of movement.

Figure 32-6 Sample Hi-Priority Failure Trend



32.5.1.6 Parts Ranking. The Supply Parts Ranking Report, L0201, is a Ships 3-M Standard Report extracted from OARS. This report provides a quick method for determining fleet material problems based on total parts issued and total cost. Parts Ranking is the ten highest "TOTAL_PRICE" parts extracted from OARS. This represents total cost to the Navy, not necessarily to the individual unit. Cost to the unit will be increased for failure to turn in a Depot Level Repairable carcass. The Parts Ranking provides the National Item Identification Number (NIIN), abbreviated NIIN nomenclature, quantity and total cost per NIIN for the ten most expensive repair parts for the candidate system/equipment.

Figure 32-7 Sample Parts Ranking



32.5.1.7 Ship's Logistics Indicator Computerized Report. The SLICR, L0106, is a Ships 3-M Standard Report extracted from OARS. The SLICR is intended to identify problem equipments within the fleet. The SLICR provides the following metrics:

a. APL/EIC.

b. APL_NOMENCLATURE/EIC_NOMENCLATURE.

c. FAILURES: Count of maintenance actions with Status_Code 2 or 3.

d. SF_MNHRS: Total number of Ship's Force man-hours expended by Ship's Force personnel or other installing personnel in completing and documenting the maintenance action.

e. PART_ISSUES: Total number of 1250 and 1348 Supply Order Forms processed in support of maintenance.

f. REPLCMNT_COST: The cost to replace parts used in maintenance with new (not refurbished) parts.

g. IMA_MNHRS: Total number of IMA man-hours expended in completing and documenting the maintenance action.

h. VISITS: The count of maintenance actions with TYCOM screening code = 1, 2 or 3.

i. ACTIONS: A count of deferral, non-deferral and IMA maintenance actions.

j. OWNSHP_COST: The sum of the cost of the labor of Ship's Force personnel, the cost of labor of the IMA personnel, the cost to replace non-repairable items and the cost to fix repairable items for a group of Job Control Numbers for a given APL or EIC.

k. COSAL: COSAL Effectiveness is the probability a requested item is stocked onboard whether or not it is available when requested.

l. NET_COSAL: NET Effectiveness is the probability that a stocked item is onboard when requested.

m. GROSS_COSAL: GROSS Effectiveness is the probability that any requested item is onboard when needed and is the product of COSAL*NET effectiveness.

n. LOG_TIME: The sum of (issue date – open date) divided by the total number of issues; average waiting time for a part issue in days.

o. MAINT_EFFECT: The probability of all required repair parts for a given maintenance action being onboard.

Figure 32-8 Sample SLICR Report

APL	APL_NOMENCLATURE	FAILURES	SF_MNHRS	PART_ISSUES	REPLCMNT_COST	IMA_MNHRS	VISITS	ACTIONS	OWNSHP_COST	COSAL	NET_COSAL	GROSS_COSAL	LOG_TIME	MAINT_EFFECT
006040508	MK46MOD0,OPTICAL SIGHT	79	6952	185	$10,375,646	48	12	139	$10,255,325	45.7	69.4	31.7	77	23.3

32.5.1.8 Ranking Matrix. The Ranking Matrix is similar to the TMA Ranking Matrix except that it provides data for all six TYCOMs and contains data on over 60,000 APLs. This fleet wide Ranking Matrix allows the Fleet to prioritize TMA/TMI selections on a Navy wide basis.

Figure 32-9 Sample Ranking Matrix

FUNCTIONAL AREA (L1)	EIC	EIC NOMENCLATURE (L2)	APL	APL NOMENCLATURE (L3)	apl_populatio	jcn_count	jcn_rank	total_mar	tmh_rank	total_repair	trrc_rank	hi_priority	hpf_rank	hi_priority	hpfdt_ran	casrep_vc	casrep_ra	BAL_VEC	BAL_RANK	MDT	MTBF	A(o)	R(m)	P(mf)	$/Failure
GUN SYSTEMS	GV	WEAPON SYSTEM, CLOSE-IN, MK 15 (PHALANX)	006090237	MK7MOD0,RADAR ASSEMBLY,MODULE	270	7592	1	203171	2	$21,890,449	1	1639	1	71419	1	501	1	19.94	1	44	80	64.8%	10.6%	89.4%	$16,314
GENERATION SYSTEMS, ELECTRIC POWER	37	GENERATOR SYSTEM, 100KW, STEWART AND STEVENSON MOI	6677980010E	ENGINE DSL 16 1140001 1600 1800RPM	106	3016	3	268700	1	$3,501,167	20	809	2	56993	2	122	3	10.16	2	70	64	47.5%	6.0%	94.0%	$17,119
HULL STRUCTURE	AD	DOORS, HATCHES, MANHOLES, SCUTTLES AND CLOSURES	319990011	WATERTIGHT DOORS, HATCHES, SCUTTLES NO OTHER APL	9229	2978	4	52793	25	$266,450	465	378	12	112546	12	1	3170	9.75	3	298	11888	97.6%	98.5%	1.5%	$6,291
PROPULSION SYSTEM, MAIN GAS TURBINE, MECHANICAL DRIVE	D1	GAS TURBINE MODULE, PROPULSION	052050008	GAS GENERATOR ASSY&GTURB MN PROSN 7LM2500PB101	137	1794	12	156811	4	$15,261,673	2	466	9	34541	9	115	4	9.34	4	76	146	65.9%	29.2%	70.8%	$47,268
ADMINISTRATION HABITABILITY, OUTFIT/FURNISHINGS	1A	EQUIPMENT AND FURNISHINGS, UTILITY SPACE	439990247	PLASTIC PROCESSOR MELT UNIT 593-6961200	530	1831	11	63246	16	$2,197,163	43	471	8	62184	8	77	17	6.37	5	132	548	80.6%	72.0%	28.0%	$10,036
GENERATION SYSTEMS, ELECTRIC POWER	36	GENERATOR SET, GAS TURBINE	052090005	ENG ASSY GAS TURB MDL 501K34	117	1249	34	59905	19	$11,631,984	4	189	36	19109	38	76	19	5.97	6	53	301	84.9%	55.0%	45.0%	$74,223
NAVIGATION SYSTEMS (ELECTRONIC AND NON-ELECTRONIC)	LB	GYROCOMPASS (CIRCUIT LC AND XLC)	282000010	AN/WSN-2 SET,GYROCOMPASS,STABILIZED	62	242	560	5592	826	$12,665,477	3	72	269	4822	269	36	74	5.80	7	67	419	86.2%	65.1%	34.9%	$179,016
GUN SYSTEMS	GV	WEAPON SYSTEM, CLOSE-IN, MK 15 (PHALANX)	006090238	MK20MOD0,ELECTRONIC ASSEMBLY,ENCLOSURE	270	2267	7	61719	17	$4,504,972	14	545	4	21048	4	156	2	5.79	8	39	241	86.2%	47.4%	52.6%	$12,796
MISSILE SYSTEMS, SURFACE	51	FIRE CONTROL SYSTEM, GUN/MISSILE, MK 92 MOD 2	006080059	MK92MOD2,FIRE CONTROL SYSTEM (BASELINE)	18	1350	24	34045	53	$4,320,047	15	579	3	35400	3	97	7	5.31	9	61	15	19.8%	0.0%	100.0%	$9,813
DISTRIBUTION SYSTEMS, ELECTRICAL POWER	46	DISTRIBUTION SYSTEM, AC LIGHTING	249990138	LANTERN ELEC 115VAC SYM 101.2	89296	2629	6	38046	41	$414,519	296	535	5	40573	5	2	3169	5.08	10	76	81233	99.9%	99.8%	0.2%	$3,619
GUN SYSTEMS	G6	WEAPON SYSTEMS, GUN	006040508	MK46MOD0,OPTICAL SIGHT	34	246	552	15632	216	$10,883,899	5	79	226	6291	226	58	27	5.05	11	80	210	72.5%	42.4%	57.6%	$143,154
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	78298233SA	CU-194(V)4/UYA-4(V) LESS IP-1091	192	595	135	178316	3	$1,468,130	80	144	79	6990	79	14	270	4.91	12	49	649	93.0%	75.8%	24.2%	$59,736
AUXILIARY SYSTEMS	TF	AIR SYSTEMS, COMPRESSED	061430285E	COMPRESSOR AIR HIGH PRESSURE 20CFH 3000PSI	57	1299	28	61519	18	$1,947,981	51	520	6	28820	6	86	9	4.63	13	55	53	49.1%	3.4%	96.6%	$8,476
DISTRIBUTION SYSTEMS, ELECTRICAL POWER	46	DISTRIBUTION SYSTEM, AC LIGHTING	249990001	FIXTURE LGTG FLRSNT MS17179-77 4	128672	2938	5	50774	31	$1,142,422	95	397	11	30912	11	0	4948	4.38	14	78	157813	100.0%	99.9%	0.1%	$7,993
PROPULSION SYSTEM, MAIN GAS TURBINE, MECHANICAL DRIVE	D1	GAS TURBINE MODULE, PROPULSION	052050018	GAS GENRATOR ASSEMBLY MDL L25250G12	66	664	114	41219	39	$8,613,557	6	160	60	11454	60	42	58	4.36	15	72	201	73.7%	40.8%	59.2%	$64,139
COMMUNICATION AND DATA SYSTEMS	QF	CRYPTOGRAPHIC EQUIPMENT	88633661	TA-970/U, TELEPHONE SET	5523	3157	2	20582	128	$526,720	230	490	7	24727	7	0	4947	4.30	16	50	5488	99.1%	96.8%	3.2%	$2,755
GENERATION SYSTEMS, ELECTRIC POWER	31	PLANTS, GENERATING, SHIPS SERVICE	052090002	ENGINE GAS TURBINE SHIPS SER GEN	78	1297	29	61095	6	$4,969,783	11	317	15	12900	15	85	11	4.27	17	41	120	74.6%	22.3%	77.7%	$25,910
AUXILIARY SYSTEMS	T8	FIREMAINS, FLS, SPKLR, WASHDOWN AND SALT WATER SER.	9982051261	VALVE GLB 2.50IPS 250PSI FLGE X MHSTH BRZ	10551	892	74	23865	106	$196,813	639	186	43	49673	43	0	4957	4.25	18	267	27620	99.0%	99.4%	0.6%	$6,190
PROPULSION SYSTEM, MAIN-STEAM, MECHANICAL DRIVE	F7	PIPING, VALVES AND ACCESSORIES, MAIN STEAM	8870954O3R	VALVE GLB STP 50IPS 900PSI SWLDG STL	5706	1034	51	23170	108	$71,477	1790	43	567	42783	567	0	5129	3.62	19	995	64612	98.5%	99.7%	0.3%	$23,216
GENERATION SYSTEMS, ELECTRIC POWER	31	PLANTS, GENERATING, SHIPS SERVICE	668890044L	ENGINE DIESEL GEN. 36SS9V-AM MDL 2894F01-GEN 6CY	36	1490	19	36978	44	$3,982,757	19	237	23	14666	23	92	8	3.58	20	62	74	54.5%	8.6%	91.2%	$23,046
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	MED15664	AM-6900/SPY-1A CG47TS9, AMPLIFIER,RADIO FREQ	48	1151	43	72876	10	$4,080,218	16	326	14	13133	14	19	177	3.52	21	40	72	64.0%	8.1%	91.9%	$21,433
AUXILIARY SYSTEMS	TF	AIR SYSTEMS, COMPRESSED	061430287	COMPRESSOR UNIT 20.0CFH 3000PSI	36	736	97	51315	30	$1,446,433	81	253	20	30991	20	55	28	3.49	22	122	69	36.1%	7.4%	92.6%	$13,830
AUXILIARY SYSTEMS	T8	FIREMAINS, FLS, SPKLR, WASHDOWN AND SALT WATER SER.	9969990613	NOZZLE-TYPE SB,WASHDOWN COUNTERMEASURES SYSTEM	10225	349	327	15134	223	$115,318	1152	136	89	41816	89	3	2037	3.49	23	307	36608	99.2%	99.5%	0.5%	$5,299
RADAR AND IFF SYSTEMS	P3	RADAR, AIR SEARCH	59226806	AS-3263/SPS-49(V), ANTENNA	90	274	480	13203	265	$7,496,394	7	51	448	3977	448	25	121	3.47	24	78	869	91.7%	81.1%	18.9%	$157,147
AUXILIARY SYSTEMS	TD	FILLING, VENT AND TRANSFER SYSTEM (FUEL AND DIESEL OIL)	98204934ZA	VALVE GATE 6.00IPS FLGE STL	248	46	3483	1660	2790	$2,167	14581	36	732	42575	732	0	5193	3.44	25	1183	3364	73.9%	94.8%	5.2%	$1,805
AUXILIARY SYSTEMS	T7	PLUMBING INSTALLATIONS	017000043	PUMP CTFGL 100GPM 30PSI 1750RPM MCC VLT	235	466	212	28432	75	$209,336	602	134	93	39703	93	25	130	3.44	26	296	854	74.2%	81.0%	19.0%	$10,049
PROPULSION SYSTEM, MAIN DIESEL, MECHANICAL DRIVE	B1	ENGINE AND CONTROLS, DIESEL	668880032L	ENGINE DIESEL 36SS9V-AM MDL 2894F01 6CYL	48	1538	18	36021	47	$4,013,172	18	179	46	15643	46	80	15	3.39	27	87	131	59.9%	25.2%	74.8%	$30,469
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	ME403291	AM-7158/SPY-1B DDG51T90, AMPLIFIER,RADIO FREQ	120	833	84	16563	194	$6,525,954	8	156	65	3220	65	46	44	3.34	28	21	375	94.8%	61.8%	38.2%	$46,079
HULL STRUCTURE	AD	DOORS, HATCHES, MANHOLES, SCUTTLES AND CLOSURES	319990907	MISC STEEL W/MAT CLOSURE COMMON REPAIR PARTS	731	1175	40	86538	5	$640,599	183	138	87	24984	87	0	4967	3.31	29	190	2579	93.5%	93.3%	6.7%	$29,726
COMMUNICATION AND DATA SYSTEMS	QD	TRANSCEIVERS (COMMUNICATION)	00014937	AN/PRC-114(V), RADIO SET	1004	927	69	8932	483	$240,689	508	190	36	37361	36	0	4953	3.29	30	197	2573	92.9%	93.2%	6.8%	$3,147
AUXILIARY SYSTEMS	TC	SCUPPERS AND DECK DRAINS	679990055	DRAIN DK SZ 2.000 IN	10075	840	81	10693	368	$117,396	1131	190	37	37488	37	0	4954	3.28	31	197	25819	99.2%	99.3%	0.7%	$2,869
GUN SYSTEMS	GV	WEAPON SYSTEM, CLOSE-IN, MK 15 (PHALANX)	006090242	M61A1 20MM GUN	270	1555	16	67956	12	$3,136,393	25	246	21	9752	21	44	56	3.19	32	36	534	93.8%	71.4%	28.6%	$23,799
RADAR AND IFF SYSTEMS	P1	RADAR, SURFACE SEARCH	57041000	AN/SPS-55, RADAR SET	81	813	87	17709	174	$2,216,016	42	219	28	13164	28	112	5	3.18	33	60	180	75.0%	36.8%	63.2%	$13,353
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	ME403311	T-1348/SPG DDG51T90, TRANSMITTER,RADAR	120	940	64	24141	101	$6,475,373	9	132	95	4160	95	55	29	3.03	34	32	443	93.4%	66.6%	33.4%	$48,796
MISSILE SYSTEMS, SURFACE	53	LAUNCHER SYSTEMS	006080067	MK92MOD6,FIRE CONTROL SYSTEM (BASELINE)	12	679	112	19143	148	$4,587,676	13	161	58	19616	58	51	39	3.02	35	116	36	23.9%	0.7%	99.3%	$33,251
GENERATION SYSTEMS, ELECTRIC POWER	31	PLANTS, GENERATING, SHIPS SERVICE	L665360289	DIESEL ENG. MDL 38ND8 1-8 12 CYL	32	962	62	79314	6	$800,932	141	162	57	19018	57	39	65	3.01	36	117	96	45.0%	15.4%	84.6%	$24,526
GUN SYSTEMS	GW	HANDLING EQUIPMENT, AMMUNITION	580630047	HOIST CHN AIR OPER CAP 4000LBS	193	47	3410	1513	3020	$99,585	1324	33	801	36876	801	0	5220	2.98	37	1117	2648	71.8%	93.9%	6.1%	$4,852
PROPULSION SYSTEM, MAIN DIESEL, MECHANICAL DRIVE	B1	ENGINE AND CONTROLS, DIESEL	668890067M	ENGINE DSL ID36SS9V-AM MDL-2949F01 8 CYL	24	1167	42	35619	50	$1,834,152	56	167	54	11568	54	98	6	2.96	38	69	70	50.3%	7.6%	92.4%	$19,514
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	MED15669	AM-6899/SPY-1A CG47TS9, AMPLIFIER,RADIO FREQ	72	719	99	77050	9	$3,498,322	21	201	33	6049	33	24	129	2.95	39	30	174	85.3%	35.6%	64.4%	$32,736
COMMUNICATION AND DATA SYSTEMS	Q7	AMPLIFIERS, AUDIO	00023028	AM-3729/SR, AMPLIFIER,AUDIO FREQ	9129	1885	10	11203	369	$372,496	338	189	39	27062	39	0	4955	2.92	40	143	23519	99.4%	99.2%	0.8%	$4,342
AUXILIARY SYSTEMS	T7	PLUMBING INSTALLATIONS	862304005	VALVE B 4.00IPS 100PSI FLGE BRZ	755	309	395	3994	1178	$60,175	2096	57	389	35928	389	1	5057	2.92	41	629	6449	91.1%	97.2%	2.8%	$3,859
MISSILE SYSTEMS, SURFACE	56	WEAPON SYSTEM, AEGIS, MK 7 MODS	ME403292	AM-7159/SPY-1B DDG51T90, AMPLIFIER,RADIO FREQ	90	1089	47	18168	164	$5,223,554	10	176	50	3952	50	43	57	2.92	42	20	221	91.6%	44.3%	55.7%	$33,808
COMMUNICATION AND DATA SYSTEMS	QE	TRANSMITTERS (COMMUNICATION)	00089485	AM-3924D(P)/URT, AMPLIFIER,RADIO FREQUENCY	434	1332	26	17286	160	$1,657,833	70	354	13	16016	13	48	43	2.90	43	45	597	93.0%	74.0%	26.0%	$6,836
PROPULSION SYSTEM, MAIN GAS TURBINE, MECHANICAL DRIVE	D1	GAS TURBINE MODULE, PROPULSION	059970003	BASSE ENCL & GTRB ASSEMBLY FFG 7 L2504G01	60	890	75	27353	81	$681,950	171	292	17	25722	17	26	139	2.88	44	88	100	53.2%	16.5%	83.5%	$6,092
AUXILIARY SYSTEMS	TF	AIR SYSTEMS, COMPRESSED	863050754	H.P. AIR SYSTEM CARTRIDGE VALVE REPAIR PARTS	138	1290	30	18677	155	$62,513	2019	405	10	17610	10	2	2033	2.86	45	43	166	79.2%	33.8%	66.2%	$1,998
MISSILE SYSTEMS, SURFACE	54	LAUNCHING SYSTEM, GUIDED MISSILE, MK 13 MOD 4	004020385	MK13MOD4,LAUNCHING SYSTEM,GUIDED MISSILE	30	1011	56	36101	46	$936,992	120	187	41	25404	41	44	49	2.82	46	136	78	36.5%	10.0%	90.0%	$12,733
COMMUNICATION AND DATA SYSTEMS	QD	TRANSCEIVERS (COMMUNICATION)	00014965	12-5140894(4956), HELMET USED WITH AN/PRC-114(V)	1011	1133	44	9776	426	$237,712	516	179	47	30101	47	0	4969	2.80	47	168	2750	94.2%	93.7%	6.3%	$3,513
AVIATION SHIP INSTALLATION	7C	RECOVERY EQUIPMENT, AIRCRAFT	U995000085	AE A/G DRIVE SYSTEM (DS) INSTL,EBCL PEND626064-2	32	1938	9	67036	13	$2,871,644	31	5	5905	1644	5905	0	8307	2.76	48	329	3116	90.5%	94.4%	5.6%	$1,110,617
AUXILIARY SYSTEMS	T8	FIREMAINS, FLS, SPKLR, WASHDOWN AND SALT WATER SER.	9982292099	VALVE BTFL 8.00IPS 200PSI FLGE BRZ	1206	40	3961	1072	4114	$9,949	7732	23	1277	32794	1277	0	5431	2.65	49	1426	25573	94.7%	99.3%	0.7%	$2,297
AUXILIARY SYSTEMS	T1	HEATING SYSTEMS	021450091	WASTE HEAT BOILER MDL EWCC 150 PSIG FWT 180 F	69	927	70	52533	26	$380,427	330	147	75	21458	75	23	141	2.54	50	146	229	61.0%	45.5%	54.5%	$16,883

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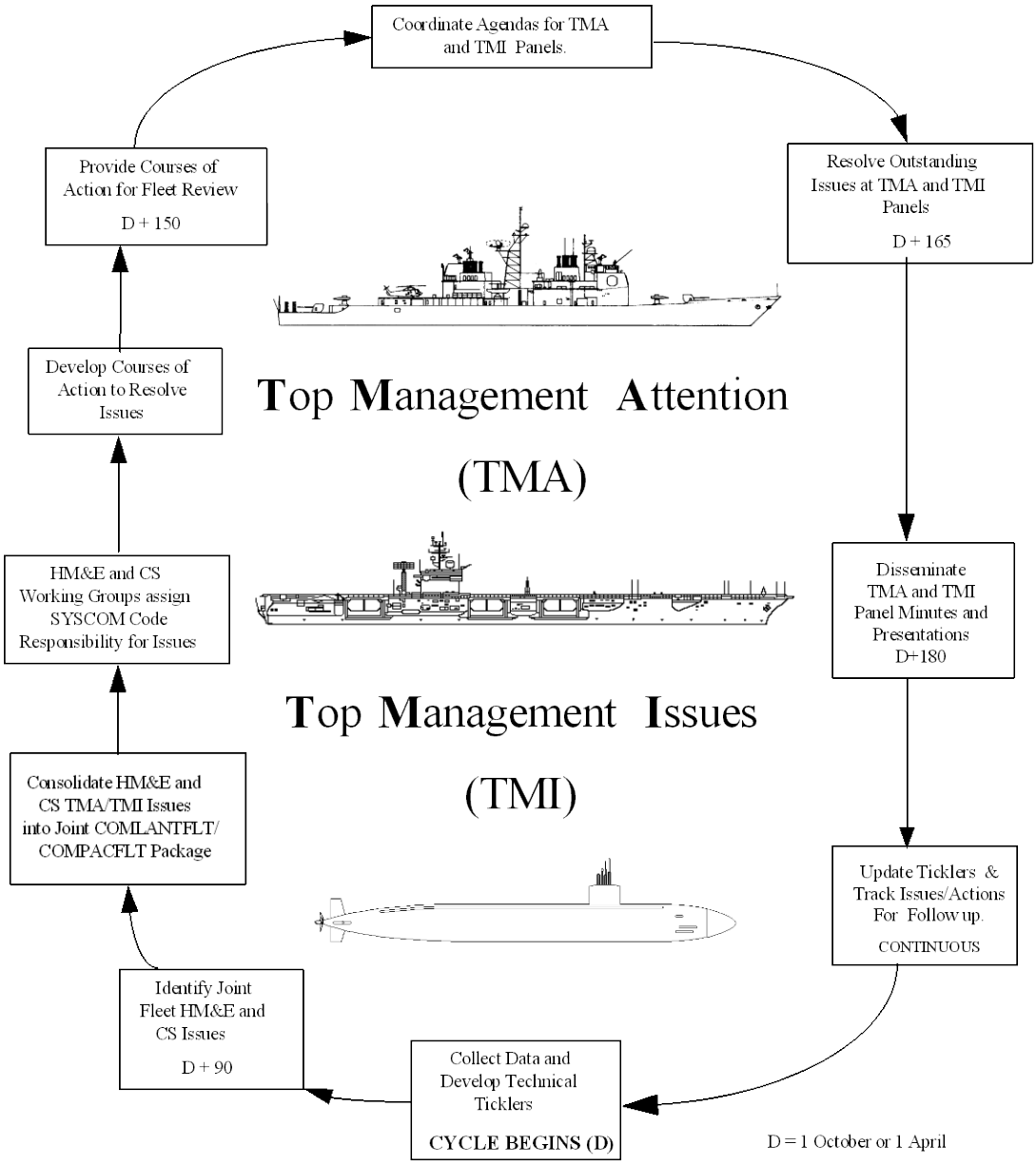
APPENDIX A

TOP MANAGEMENT ATTENTION AND TOP MANAGEMENT ISSUES FLOWCHART



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VOLUME VI

CHAPTER 33

MAINTENANCE AND MODERNIZATION BUSINESS PLAN

REFERENCES.

(a) OPNAVENOTE 4700 - Representative Intervals, Durations, Maintenance Cycles, and Repair Mandays for Depot Level Maintenance Availabilities of U.S. Navy Ships

LISTING OF APPENDICES.

A. Executive Summary Sheet

33.1 MAINTENANCE AND MODERNIZATION BUSINESS PLAN.

a. The Maintenance and Modernization Business Plan (MMBP) identifies the total private sector maintenance funding budget available to support the ship during the execution year and advance planning and funding needs for availabilities to be executed in future years. The MMBP also includes funding for modernization. This includes funding for all Fleet Alterations and those Program Alterations managed by the Type Commander (TYCOM) or Naval Supervisory Authority (NSA) (Regional Maintenance Center (RMC)/Naval Shipyard/Supervisor of Shipbuilding). The MMBP does not include funding for modernization that is managed by the Ship's Program Manager (SPM) or Participating Acquisition Resource Manager and accomplished by Alteration Installation Teams through separately administered contracts.

b. MMBPs will be developed for all ships that will be in commission at the start of the upcoming Fiscal Year (FY). A second MMBP will be developed for any ship scheduled to start a Chief of Naval Operations (CNO) Availability in the first quarter of the following FY. This second business plan will address only the CNO Availability controls, a Risk Assessment and will not include Continuous Maintenance (CM) controls. The TYCOM will normally use the same TYCOM Target Controls for these out-year CNO Availabilities as used for the upcoming FY CNO Availability controls. These out-year MMBPs will require additional refinement in the next MMBP cycle.

33.2 MMBP RESPONSIBILITIES.

33.2.1 Maintenance Team Responsibilities. The Maintenance Team identifies budget needs to the NSA and the TYCOM based on well-documented work in the Current Ship's Maintenance Project (CSMP) and Class Maintenance Plan. The Maintenance Team MMBP identifies the total maintenance funding budget required to support the ship during the execution year and advance planning and funding needs for availabilities to be executed in future years.

a. The Maintenance Team establishes the funding phasing plan that will roll up to the Fleet Commander's overall phasing plan. It should be noted that the accuracy of the phasing plan is critical to the Fleet and TYCOM's ability to provide timely and stable funding. A Maintenance Team over executing or under executing its budget will cause unnecessary funding churn. For this reason, Maintenance Teams and NSAs should develop phasing plans that are accurate and reasonably achievable. For example, if a CNO Availability is scheduled to start in the first month of a quarter, the funding for that availability will be required in the previous quarter and should be phased in the earlier quarter. CM phasing will depend largely on ships' schedules and should not simply be divided into four equal quarters in the phasing plan.

b. Each Maintenance Team will include an assessment of known material readiness risks associated with the MMBP funding levels in their initial MMBP submittal. In a case where there is unacceptable risk associated with the assigned funding controls, the TYCOM may agree to adjust assigned controls.

c. Maintenance Teams shall use the format provided in Appendix A for MMBP submission.

33.2.2 NSA Responsibilities. For submarines and aircraft carriers, actions assigned below to the NSA may be performed directly by the TYCOM or a designated agent (i.e., Immediate Superiors In Command (ISIC), Trident Refit Facility, or Naval Submarine Support Center).

a. The NSA has the authority to execute ship maintenance and shall do so in accordance with Fleet and TYCOM policies and directives.

b. When conditions warrant, the NSA will develop a Business Adjustment Factor (BAF) percentage for CNO Availabilities to account for local business conditions. BAFs are established as a percentage of the availability budget, similar to the growth or award fee percentages. The BAF is an adjustment or hedge against impacts to the manday rate or premium levels for specific CNO Availabilities due to factors such as high or low port loading. Examples of other situations that may require an allowance in the BAF are seasonal adverse weather patterns, anticipated labor union issues, anticipated labor rate adjustments or the general business conditions in the port.

c. The NSA will make any additional adjustments to TYCOM target controls based on prioritization of the work package, risk analysis and Business Case Analysis (BCA) included in the Maintenance Team's MMBP submissions. The overall, total NSA CNO Availability funding controls and total CM funding controls provided to the NSA by the TYCOM may not be exceeded in these adjustments.

d. (Surface Ships only) During the year of MMBP execution, changes to individual ship controls exceeding 10% require TYCOM notification; changes in excess of 20% require TYCOM approval. In the event adjustments are required that exceed available funds, the NSA will provide a written justification supporting the change and a formal recovery plan to the TYCOM for approval.

e. Appendix A may be modified as required, with TYCOM concurrence, for unique NSA processes or circumstances.

33.2.3 TYCOM Responsibilities (Surface Force Ships only).

a. Establish Force maintenance policies, directives and authorize the NSA to execute those policies and directives.

b. Provide Target Controls to the NSA in March of each year and review those controls as required by the budget approval process. These controls are between the TYCOM and the Port Engineer.

c. Ensure the established modernization plan is accurate and issue Fleet Alteration Letters of Authorization.

d. Validate MMBPs and promulgate approved CNO availability and Continuous Maintenance funding controls in naval message format at the beginning of each fiscal year.

e. Align Surface Warfare Enterprise processes with established waterfront support organizations and establish the readiness and cost control processes required to provide greater overall enterprise effectiveness.

f. Support the ISIC with warships ready for tasking by aligning manning, training, equipping and maintaining processes of ships by class.

g. Assess current readiness, analyze metrics, examine trends, determine root causes, establish lessons learned and provide recommendations and solutions, while emphasizing readiness and cost control.

h. The TYCOM will provide the RMCs with TYCOM Target Controls in March of each year and will revise these controls as required by the budget approval process.

33.2.4 TYCOM Responsibilities (Aircraft Carriers and Submarines only). The TYCOM establishes Force maintenance policies and directives and authorizes the NSA to execute those policies and directives.

a. The TYCOM ensures that the established modernization plan is accurate and issues Fleet Alteration Letters of Authorization.

b. The TYCOM has final approval of all MMBPs and will promulgate approved CNO Availability and CM funding controls in naval message format.

33.2.5 Ship Program Manager Responsibilities. The SPM ensures that the Letter of Authorization for Program Alterations is accurate and includes Program Alterations funding estimates.

33.3 THE MMBP SUBMISSION.

33.3.1 MMBP Spreadsheet. The required format for submission of MMBPs is provided in Appendix A of this chapter. As noted in paragraph 33.2.2.e. of this chapter, changes may be made to Appendix A to reflect NSA unique circumstances.

33.3.1.1 General Description. The MMBP provides the maintenance team's description of the planned maintenance and funding phasing.

33.3.1.2 Executive Summary Sheet.

a. Section I: The Schedule Overview is intended to illustrate major milestones in the current and upcoming year: assessments, deployments, availabilities, decommissioning, etc.

b. Section II: This section begins with initial controls (CNO and CM) and applies adjustments to those controls by TYCOM and RMC. The final numbers in each of these categories are funds available for assignment to CM and CNO work as appropriate. Particular care must be taken to ensure that the sign (where subtraction has a "-" or a number is preceded and followed with parentheses, e.g., "(10)" indicating a negative number) of these numbers are correct, as they are linked to the CONTROLS AND PHASING sheet.

c. Section III: Ensure that program alterations (K-Alterations) are included here and not included in other locations. D-Alterations, Machinery Alterations, and Ship Change Documents should be located in Section II.

d. Section IV: This section provides an area for the maintenance teams to indicate areas of risk associated with the particular FY's maintenance plan. This section does not include topics that are not applicable to the execution FY risk. Areas to be discussed here:

(1) Work items identified in the UNFUNDED REQUIREMENTS sheet, and their impact to current or future operations.

(2) Upcoming assessments that may identify serious discrepancies.

e. Section V: This section provides a general rollup of the work planned for the execution FY. Items in this section need not be identified by Job Control Number/Job Sequence Number, but rather a general layout of work to be brokered to individual availabilities and their notional values; this should include historical repairs from assessments. The bottom of this sheet sums items from other portions of the workbook for comparison purposes. Items of note in this section:

(1) The items identified in the "green" section of Section V are planned for completion in the execution FY and therefore are not elements of risk.

(2) The "shortfall" cell should be equal to or less than the UNFUNDED cell.

(3) The Risk section on the bottom of the spreadsheet feeds directly from the UNFUNDED REQUIREMENTS SHEET. This section sums the unfunded items by funding type and then by associated risk (see paragraph 33.3.1.4 of this chapter).

33.3.1.3 Controls and Phasing Sheet. This sheet applies changes (growth pools, overhead, award fees, and the business adjustment factors) to the adjusted controls. This sheet provides a further adjustment to the controls, as well as a phasing of the controls that should be completed by the Maintenance Teams so as to reflect the maintenance schedule. Particular care should be taken to ensure that sums are correct, since TYCOMs use this sheet to plan quarterly cash flows.

33.3.1.4 Unfunded Requirements Sheet.

a. This sheet identifies those items in the Class Maintenance Plan or validated maintenance items in the ship's CSMP that cannot be completed in the execution FY due to funding constraints. To be included in the UNFUNDED REQUIREMENTS list, the following conditions must be satisfied:

(1) The work can be accomplished in the time available if additional funding is applied, and/or

(2) The work can be accomplished in the execution year if additional Continuous Maintenance Availability (CMAV)/CNO time were allotted.

b. The column marked "Funding Type" has permissible entries: CM, CNO and AP. They are meant to indicate the most likely funding areas to which the work would be brokered if funding were available.

c. The "Risk" column has permissible entries of "High," "Medium" and "Low" as determined by a BCA guided by Volume II, Part I, Chapter 4, Appendix D of this manual. These columns must be populated in order to properly assess the risk associated with the MMBP, as well as to feed properly to the Executive Summary Sheet.

33.3.2 Prioritization. Maintenance Teams should use any and all resources at their disposal to prioritize the work for which funds are available The prioritized work should support the ship's current readiness requirements as well as work designed to ensure the ship can operate effectively its full service life.

33.3.3 Maintenance Summary and Risk Assessment. The Maintenance Team and TYCOMs will address any known maintenance risks based on Funding Controls or ship's maintenance schedule for the upcoming FY. This risk assessment must provide sufficient detail to enable NSA/TYCOM to make critical decisions with respect to funding adjustments. Photographs, inspection reports, docking reports, operating logs, vibration analysis, Maintenance Figure of Merit (MFOM) data and other objective evidence of important maintenance which is not able to be accomplished within the Maintenance Teams funding controls should be included.

33.4 BUDGET PROCESS AND MMBP DEVELOPMENT TIMELINE.

33.4.1 Guidance. In order to develop MMBPs prior to the start of the FY in which they will be executed, it is necessary to begin the process well before the final budget is approved and financial controls are passed to the Fleet Commanders, TYCOMs, and eventually to the Maintenance Teams. Maintenance Teams shall develop MMBPs using the following guidance and timeline. For submarines and aircraft carriers, actions assigned below to the NSA may be performed directly by the TYCOM or a designated agent (i.e., ISICs, TRIDENT Refit Facility, or Naval Submarine Support Center).

33.4.2 Initial Budget Guidance (March).

a. The TYCOM, in coordination with the Fleet Maintenance Officer, will establish an initial estimate of the expected funding controls for the next FY. Based on this information, TYCOMs will develop a common maintenance funding strategy, establish initial TYCOM Target Controls for each ship's CNO Availability and each ship's CM budget. The CM budget provides funds for both the yearlong continuous availability and scheduled CMAVs. For Surface Ships only, these TYCOM Target Controls are passed from the TYCOM to the Maintenance Team as the initial input to the MMBP process.

b. The TYCOM and the SPM will ensure Letters of Authorization accurately reflect the modernization plan. SPMs and Participating Acquisition Resource Managers will provide installation estimates for Program Alteration installations or installation support services for which funding will be provided to the Maintenance Team. The TYCOM Target Controls discussed above will be separated into Fleet maintenance and Fleet funded alteration controls by the TYCOM before the controls are passed to the NSA.

c. (Surface Ships Only) RMCs may modify initial TYCOM target controls to support their mission of providing ships ready for tasking.

33.4.3 Provide Controls to Maintenance Team (April).

a. The Maintenance Teams will use the Class Maintenance Plan to develop assessment schedules with NSA for inclusion in individual MMBPs.

b. ISIC shall provide ship operational schedule information to the Maintenance Team. This information is used to schedule CMAVs and Assessments for the upcoming year.

c. The NSA will establish BAF if required for each CNO Availability, anticipated CNO Availability and CM growth percentages, support service percentages and Award Fee percentages as applicable for entry into the MMBP Budget Planning Sheet, Appendix A. For surface ships, Maintenance Teams may modify target controls for ships within a class based on their relative material condition. Any individual ship MMBP that differs by more than 10% from the initial TYCOM target control should include justification for the deviation. The total control for all ships of each class should not exceed the initial TYCOM target control.

d. Maintenance Teams will develop MMBPs based on these initial controls. This iterative process will involve risk assessment and BCA of any differences between the Maintenance Teams identified funding needs and the funding controls established for them.

33.4.4 Execution Strategy Adjustments (May). The TYCOM in coordination with Fleet Commanders will determine if adjustments to the TYCOM Target controls are required. For surface force ships, the TYCOM will provide the NSA with direction for the adjustment of controls.

33.4.5 (Surface Ships only) Maintenance Team Submit MMBPs for Approval via NSA (June). The NSA approves, consolidates and submits copies of each assigned ship's MMBP to the TYCOM for review and approval.

33.4.6 TYCOM Approves MMBPs (July).

a. (Surface Ships only) RMCs will consolidate their MMBPs (by coast and active/reserve) and submit MMBPs to the TYCOM for approval. Any individual ship MMBP that differs by more than 10% from the initial TYCOM target control should include justification for the deviation. The total control for all ships shall not exceed the total TYCOM target for each class.

b. The TYCOM approves MMBPs and promulgates final approved CNO availability and CM controls.

c. The TYCOM/RMC provides final CNO budget controls and CM controls to the Maintenance Teams.

33.4.7 Submit Phasing Plans (August).

a. The NSA funds administrators will review and adjust each Maintenance Team's phasing plan to correspond with the total controls. Each NSA will provide the Maintenance Team phasing plans to TYCOM.

b. The TYCOM will submit phasing plans to the Fleet Commander.

33.5 BUSINESS PLAN RESOURCES.

33.5.1 Resources. The following resources and information shall be reviewed and considered in the development of MMBPs. This list is not intended to be all-inclusive and is provided as a starting point.

a. The notional CNO man-day requirements used by the TYCOM to establish initial TYCOM Target Controls.

b. The ship's CSMP.

c. The ship's Baseline Availability Work Package.

d. The Class Maintenance Plan.

e. Areas of specific concern that will be assessed or inspected prior to the availability.

f. Modernization Plan - Program and Fleet Alterations.

(1) Program Ship Change (SC) Authorization letters provided by Program Executive Officer Ships provides. These include NAVSEA, Space and Naval Warfare Systems Command (SPAWAR), Naval Supply Systems Command and Naval Air Systems Command (NAVAIR) planned installations.

(2) Fleet SC Authorization letters provided by TYCOM. These include Fleet Alterations, Alterations Equivalent to Repair, and Machinery Alterations.

(3) Information contained in Program Executive Officer/Systems Command and TYCOM SC authorization letters will be consolidated into Hull Modernization Plans. Hull Modernization Plans will list all SCs (Program and Fleet Alterations) programmed for installation on each ship for the entire FY.

g. Deployment and operational schedules.

h. Assessment and inspection schedules (Hull, Mechanical, Electrical Readiness Assessment (HMERA), Combat Systems Command, Control, Communications and Computer Readiness Review (C5RA), Board of Inspection and Survey (INSURV), etc.).

i. Ship's event schedules (Change of Command, etc.).

j. Long-term ship's CNO Availability and decommissioning schedule.

k. CNO Availability and CMAV Planning Milestones.

l. Departures from Specifications.

m. Habitability Project Plan/Schedule (TYCOM provide).

n. Other Availability Programs (TYCOM provide).

(1) Underwater Hull Cleaning.

(2) Calibration.

(3) Other miscellaneous.

APPENDIX A

EXECUTIVE SUMMARY SHEET

USS XXX (XX-XX)

MAINTENANCE AND MODERNIZATION BUSINESS PLAN

FY 2010

PORT ENGINEER: **PE**
PROJECT MANAGER: **PM**

I. SCHEDULE OVERVIEW

	EVENT		DATES	
A.	**CNO Availability**	**(Start/End)**		
B.	**Continuous Maintenance Avails (CMA)**			
	CMA 0A1	(Start/End)		
	CMA 0A2	(Start/End)		
	CMA 0A3	(Start/End)		
	CMA XA4	(Start/End)		
C	**Surge Ready Asset**			
		(Start/End)		
		(Start/End)		
D.	**Assessments - Major**			
	PSART	(Start)		
	C5RA	(Start)		
	Main Propulsion Plant Assessment DEI 1, 3 SSDG	(Start)		
	Main Propulsion Plant Assessment Gas Turbine Inspections	(Start)		
	Total Ship Readiness Assessment (TSRA) (1, 2, 3, 4)	(Start)		
E.	**Training Cycle**			
	Ultra E + C (Engineering and Combat Readiness Training Assessment, 12M Cert)	(Start)		
	Ultra S+ (Sustainment, 12M Cert)	(Start)		
	Group Exercise	(Start)		
	Group Certification	(Start)		
F.	**Deployment**			
			Deploys	**Returns**

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

	EVENT		DATES	
G.	**INSURV**	**(Last/Next)**		
			Deploys	**Returns**
H.	**Outyear CNO Availabilities**			
		(Start/End)		
		(Start/End)		
		(Start/End)		
I.	Docking CNO Avail - Next	(Start/End)		
J	Planned DECOMM Date	(End)		

II. TYCOM FUNDING CONTROLS

A.	MFOM Data		
	a.	Class Average Weighted MROM (MFOMw)	$0
	b.	MFOMw	$0
B.	Continuous Maintenance & I - Level Expenditures		
	a.	Initial TYCOM CM Target Control (total)	$0
	b.	CM Control Designated for Fleet Alterations	$0
	c.	RMC Net Target Control for Maint (c+d)	$0
	d.	Prior Year Funds Available	$0
	e.	RMC Adjustments (Indicate + or -)	$0
	f.	FY-10 TYCOM Funding CM CONTROL (Maint) e+f+g	$0
	g.	FY-10 TYCOM Funding DIL CONTROL (Maint)	$0
	h.	Total TYCOM CM & DIL Control (h+b+i)	$0
C.	FY-10 CNO Avail		
	a.	Initial TYCOM Target Control (total)	$0
	b.	CNO Avail Control Designated for Flt Alts	$0
	c.	CNO Maint Control before Adjustment(a-b)	$0
	d.	RMC Net Target Control for Maint	$0
	e.	Prior Year Funds Available	$0
	f.	RMC Adjustments (Indicate + or -)	$0
	g.	TYCOM Funding CNO CONTROL (Maint) (e+f+g)	$0
	h.	Total TYCOM CNO Control (h+b)	$0
D.	Advance Funding Previously Obligated on FY-10 CNO Avail		
	a.	FY-08 Advance Funding	$0
	b.	FY-09 Advance Funding	$0
	c.	TOTAL	**$0**

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

E.	Advance Funding for FY-11 CNO Avail		
	a.	FY-09 Advance Funding	**$0**
	b.	FY-10 Advance Funding	**$0**
F.	Habitability (TYCOM N43 Managed & Funded)		
G.	ORATA (TYCOM N43 Managed & Funded)		
	a.	Underwater Hull Cleaning	$0
	b.	Calibration, other Misc ORATA Programs	$0
	c.	Total	$0
H.	Assessments (Mission Funded - estimates for RMC budgeting only)		
	a.	HMERA	$0
	b.	C5RA	$0
	c.	TSRA	$0
	d.	Total	$0

III. PROGRAM ALTERATION FUNDING CONTROLS (Funding Managed by RMC)			
A.	NAVSEA (PEO-SPM)		
	a.	CNO Avail Program Alteration Controls	$0
	b.	CM Program Alteration Controls	$0
B.	SPAWAR		
	a.	CNO Avail Program Alteration Controls	$0
	b.	CM Program Alteration Controls	$0
C.	NAVAIR		
	a.	CNO Avail Program Alteration Controls	$0
	b.	CM Program Alteration Controls	$0

IV. NARRATIVE RISK ASSESSMENT

A. Schedule Summary		
	a. CNO avail:	
	b. Deployment cycle (Training sched):	
	c. INSURV	
	d. CMAV	

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

	e. Outyears (Future major events, AP CNO, Home port shift, etc.)	
B. Assessment/Repair Summary		
	a. Main Propulsion	
	b. Auxiliary Equipment	
	c. Distributive Systems	
	d. Combat Systems	
C. Corrosion Control Summary		
	a. Tanks b. Decks/ Bilges c. Structural (fan rooms, stacks)	
D. CLASS Specific Major Anticipated Repairs.		
	a.	
	b.	
	c.	
E. TYCOM Unscheduled Modernization		
	a. Fleet Alts	
F. Summary Risk Assessment.		
	a. Risk Assessment Narrative:	

V. PLANNED WORK ROLLUP

Target	Item	Notional Cost

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

V. PLANNED WORK ROLLUP (Cont'd)

Target	Item	Notional Cost
UNF	Unfunded Avail Total (RMAIS)	$0
AP	Advanced Planning (Next FY Avail)	$0
CNO	Fleet Alts	$0
N/A	Award Fees (Auto fill from Controls & Phasing)	$0
N/A	Services (Auto fill from Controls & Phasing)	$0
	Total Requirement	**$0**
	Total MMBP	**$0**
	SHORTFALL	**$0**
	CNO Risk	$0
	High	$0
	Medium	$0
	Low	$0
	CM Risk	$0
	High	$0
	Medium	$0
	Low	$0
	AP/AF Risk	$0
	High	$0
	Medium	$0
	Low	$0

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

CONTROLS AND PHASING						
FYxx xxRMC BUDGET FOR USS XXX (XX-XX)						
			Total/Phasing	**Q1**	**Q2**	**Q3**	**Q4**
FY xx TYCOM Budget			$0	$0	$0	$0	$0
FY xx DIL Budget			$0	$0	$0	$0	$0
FY xx PROGRAM Alt Budget			$0	$0	$0	$0	$0
FY xx TOTAL MMBP Budget			**$0**	**$0**	**$0**	**$0**	**$0**
FYxx xxRMC TYCOM CNO BUDGET							
FYxx CNO BUDGET	**TOTAL**		Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
	$0		**$0**	$0	$0	$0	$0
			Budget	**Comments**			
	1.	Maintenance	$0	Estimate			
	2.	Fleet SHIPALTS		Based on Modernization Plan, LOAs			
Sum of 1,2,c,d	a.	Package Subtotal	$0				
	b.	Growth % 12.00%	$0	% of (a) based on RMC policy, cannot exceed 12%			
	c.	Service / Support % 17.00%	$0	Historical percentage of (a) for 800/900's, adjusted for program Alt prorated costs			
	d.	LLTM	$0	As required			
Change if 10% is not correct	e.	Award Fee % of (a+b+d) 11.23%	$0	For Cost contracts only Max % possible based on contract terms			
	f.	Other costs	$0	Work accomplished outside of Avail contract			
	g.	Pierside Refurb	$0	As applicable at each RMC			
Business Adj Factor	h.	BAF % of (a+b+e) 0.00%	$0	Enter positive percent value if Gov Estimate expected to be LOWER than winning Bid / negotiated Target Cost			
CNO AVAIL BUDGET			**$0**				
FY xx FUNDING REQ			**$0**	IF AN AVAIL CROSSES FISCAL YEARS, PREDICT GROWTH AND ASSOCIATED AWARD FEE FOR THE FOLLOW ON FY			
FY xx FUNDING REQ			**$0**				
TOTAL CNO Execution Control			$0	As established by RMC / TYCOM			
Prior FY Funds			$0	AP or MSMO contractor funds still available in execution			
TOTAL CNO CONTROL			**$0**	**Total SERMC CNO Avail Funding Available**			
FYxx xxRMC TYCOM CM BUDGET							
FYxx CM BUDGET	**TOTAL**		Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
	$0		**$0**	$0	$0	$0	$0

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

CONTROLS AND PHASING (Cont'd)					
				Budget	**Comments**
	1.	Maintenance		$0	Estimate. Before growth
	2.	Fleet SHIPALTS		$0	Estimate
Sum of 1,2	a.	CM Package Subtl		$0	Base Budget. No Growth or Fees.
	b.	Growth %	12.00%	$0	% of (a) based on RMC policy, cannot exceed 12%
Change if 10% is not correct	c.	Award Fee % of (a+b)	0.00%	$0	For Cost Contracts only Max % possible based on contract terms
	d.	Other costs		$0	
CM Budget				**$0**	
FYxx CM Control				$0	As established by RMC / TYCOM
Prior FY Funds				$0	AP or MSMO contractor funds still available in execution
TOTAL CM CONTROL				**$0**	**Total SERMC CM Funding available**

Advance Planning Budget		**Q1**	**Q2**	**Q3**	**Q4**
FY xx CNO Avail Advance Planning	**$0**	$0	$0	$0	$0
FY xx CNO Avail Advance Planning	**$0**	$0	$0	$0	$0

FY10 SERMC TYCOM DIL Budget							
FY xx DIL Budget	**TOTAL**	Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
	$0	**$0**	$0	$0	$0	$0

				Budget	**Comments**
	1.	Maintenance		$0	Estimate. Before growth
	2.				
Sum of 1,2	a.	DIL Package Subtl		$0	Base Budget. No Growth or Fees.
	b.	Growth %	12.00%	$0	% of (a) based on RMC policy, cannot exceed 12%
Change if 10% is not correct	c.	Award Fee % of (a+b)	0.00%	$0	For Cost Contracts only Max % possible based on contract terms
	d.	Other costs		$0	
DIL Budget				**$0**	
FYxx DIL Control				$0	As established by RMC / TYCOM
Prior FY Funds				$0	AP or MSMO contractor funds still available in execution
TOTAL DIL CONTROL				**$0**	**Total SERMC DIL Funding available**

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

CONTROLS AND PHASING (Cont'd)								
FYxx CNO AVAIL Program ALT Modernization Budget								
NAVSEA Program Alts	**TOTAL**			Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
	$0			**$0**	$0	$0	$0	$0
				Budget	**Comments**			
	1.	Labor & Matl		$0	From Mod Plan, LOAs			
	2.	Services		$0	Negotiated with RMC for 800/900's			
Sum of 1,2	a.	Package Subtotal		$0	Base Budget. No Growth or Fees.			
	b.	Growth %	10.00%	$0	% of (a) based on RMC / PARM policy			
	c.	Award Fee % of (a+b)	11.23%	$0	For Cost contracts only Max % possible based on the contract			
	d.	BAF % of (a+c)	0.00%	$0	Enter positive percent value if Gov Estimate expected to be LOWER than winning Bid / negotiated Target Cost			
	e.	Other costs		$0	Explain in comments			
NAVSEA Budget				**$0**	Budget cannot exceed control			
FYxx NAVSEA Control				**$0**	From Mod Plan, LOAs			
SPAWAR Program Alts	**TOTAL**			Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
	$0			**$0**	$0	$0	$0	$0
				Budget	**Comments**			
	1.	Labor & Matl		$0	From Mod Plan, LOAs			
	2.	Services		$0	Negotiated with RMC for 800/900's			
Sum of 1,2	a.	Package Subtotal		$0	Base Budget. No Growth or Fees.			
	b.	Growth %	10.00%	$0	% of (a) based on RMC / PARM policy			
	c.	Award Fee % of (a+b)	11.23%	$0	For Cost contracts only Max % possible based on the contract			
	d.	BAF % of (a+c)	0.00%	$0	Enter positive percent value if Gov Estimate expected to be LOWER than winning Bid / negotiated Target Cost			
	e.	Other costs		$0	Explain in comments			
SPAWAR Budget				**$0**	Budget cannot exceed control			
FYxx SPAWAR Control				**$0**	From Mod Plan, LOAs			
NAVAIR/ OTHER ALTS	**TOTAL**			Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
	$0			**$0**	$0	$0	$0	$0
				Budget	**Comments**			
	1.	Labor & Matl		$0	From Mod Plan, LOAs			
	2.	Services		$0	Negotiated with RMC for 800/900's			

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

CONTROLS AND PHASING (Cont'd)					
Sum of 1,2	a.	Package Subtotal		$0	Base Budget. No Growth or Fees.
	b.	Growth %	10.00%	$0	% of (a) based on RMC / PARM policy
	c.	Award Fee % of (a+b)	11.23%	$0	For Cost contracts only Max % possible based on the contract
	d.	BAF % of (a+c)	0.00%	$0	Enter positive percent value if Gov Estimate expected to be LOWER than winning Bid / negotiated Target Cost
	e.	Other costs		$0	Explain in comments
NAVAIR/OTHER ALTS Budget				**$0**	Budget cannot exceed control
FYxx NAVAIR/OTHER Control				**$0**	From Mod Plan, LOAs

NAVSEA Program Alts	**TOTAL**	Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
	$0	**$0**	$0	$0	$0	$0

				Budget	**Comments**
	1.	Labor & Matl		$0	From Mod Plan, LOAs
	2.	Services		$0	Negotiated with RMC for 800/900's
Sum of 1,2	a.	Package Subtotal		$0	Base Budget. No Growth or Fees.
	b.	Growth %	10.00%	$0	% of (a) based on RMC / PARM policy
	c.	Award Fee % of (a+b)	11.23%	$0	For Cost contracts only Max % possible based on the contract
	d.	BAF % of (a+c)	0.00%	$0	Enter positive percent value if Gov Estimate expected to be LOWER than winning Bid / negotiated Target Cost
	e.	Other costs		$0	Explain in comments
NAVSEA ALTS Budget				**$0**	Budget can not exceed control
FYxx NAVSEA Control				**$0**	From Mod Plan, LOAs

SPAWAR Program Alts	**TOTAL**	Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
	$0	**$0**	$0	$0	$0	$0

			Budget	**Comments**
	1.	Labor & Matl	$0	From Mod Plan, LOAs
	2.	Services	$0	Negotiated with RMC for 800/900's

APPENDIX A

EXECUTIVE SUMMARY SHEET (Cont'd)

CONTROLS AND PHASING (Cont'd)								
Sum of 1,2	a.	Package Subtotal		$0	Base Budget. No Growth or Fees.			
	b.	Growth %	10.00%	$0	% of (a) based on RMC / PARM policy			
	c.	Award Fee % of (a+b)	11.23%	$0	For Cost contracts only Max % possible based on the contract			
	d.	BAF % of (a+c)	0.00%	$0	Enter positive percent value if Gov Estimate expected to be LOWER than winning Bid / negotiated Target Cost			
	e.	Other costs		$0	Explain in comments			
SPAWAR ALTS Budget				**$0**	Budget cannot exceed control			
FYxx SPAWAR Control				**$0**	From Mod Plan, LOAs			
NAVAIR/ OTHER ALTS		**TOTAL**		Phase check sum	**Q1**	**Q2**	**Q3**	**Q4**
		$0		**$0**	$0	$0	$0	$0
				Budget	**Comments**			
	1.	Labor & Matl		$0	From Mod Plan, LOAs			
	2.	Services		$0	Negotiated with RMC for 800/900's			
Sum of 1,2	a.	Package Subtotal		$0	Base Budget. No Growth or Fees.			
	b.	Growth %	10.00%	$0	% of (a) based on RMC / PARM policy			
	c.	Award Fee % of (a+b)	11.23%	$0	For Cost contracts only Max % possible based on the contract			
	d.	BAF % of (a+c)	0.00%	$0	Enter positive percent value if Gov Estimate expected to be LOWER than winning Bid / negotiated Target Cost			
	e.	Other costs		$0	Explain in comments			
NAVAIR/OTHER ALTS Budget				**$0**	Budget cannot exceed control			
FYxx NAVAIR/OTHER Control				**$0**	From Mod Plan, LOAs			

USS XXX (XX-XX)		**Total =**		**$0**			
JCN	**EQUIP NOUN NAME**	**JOB SUMMARY**	**MFOM (PRI CAT)**	**PE Est**	**Funding Type**	**Risk**	**Remarks**
		MMBP Shortfalls					

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VOLUME VI

CHAPTER 34

SUBMARINE FLY-BY-WIRE SHIP CONTROL SYSTEM MAINTENANCE AND CERTIFICATION

REFERENCES.

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

(b) NAVSEA SL720-AA-MAN-010 - Fleet Modernization Program (FMP) Management and Operation Manual

(c) NAVSEAINST 4720.14 - Temporary Alterations to Active Fleet Submarines; Control of

34.1 PURPOSE. To provide guidance for the proper administration of a uniform maintenance program in support of the certification requirements for Submarine Fly-By-Wire (FBW) Ship Control Systems (SCS).

34.1.1 Applicability. The requirements in this chapter shall apply to SEAWOLF and VIRGINIA Class submarine FBW SCSs and all future submarines that are designed with Fly-By-Wire technology.

34.2 SUBMARINE FLY-BY-WIRE MAINTENANCE AND CERTIFICATION.

34.2.1 General. The Submarine FBW SCS Flight Critical Component Boundary consists of electronic hardware components and software units within the submarine FBW Boundary that process safety critical functions and data elements.

a. Safety critical electronic components within the Submarine Flight Critical Component Boundary shall be determined per reference (a) and shall be identified as Submarine Flight Critical Components (SFCC).

b. Safety critical software units within the SFCC Boundary shall be determined per reference (a). Safety critical software units shall require additional testing and/or analysis, be marked, configuration managed, and controlled per the requirements in reference (a).

34.2.2 Objective. The objective of the maintenance and certification process is to verify that SFCCs provide acceptable levels of performance in direct support of ship safety throughout the allowable operating range when used with approved operating and maintenance procedures. This chapter provides the policy by which repairs, maintenance, alterations and material control shall be accomplished to those components within the FBW SCS Certification Boundary as described in reference (a).

34.2.3 Maintenance and Repair Requirements. Following initial submarine FBW SCS certification by Naval Sea Systems Command (NAVSEA), the Submarine Type Commander, irrespective of the activity accomplishing the work, the ships operating status and/or contract/task the work is authorized under, is responsible for maintaining the submarine FBW SCS certification per the requirements of reference (a). The underlying principals for sustaining FBW SCS certification are:

a. All work and testing within the FBW SCS and SFCC Boundaries shall be accomplished and documented per the requirements in reference (a).

b. Unrestricted Operations/Maintenance Requirement Card 19 shall be accomplished within required periodicity and as required to sustain system certification following work/maintenance on the SCS.

c. All fleet activities, In-Service Engineering Activities (ISEA), repair activities or shipyards (public or private) must use Controlled Work Packages (CWP), Task Group Instructions (TGI), or ripouts to document the accomplishment of work within the SFCC Boundary. CWPs/TGIs/ripouts shall provide greater assurance that any work accomplished is authorized, documented and executed per specifications and requirements, and is supported by Objective Quality Evidence.

d. Work control documents shall be clearly marked as SFCC for auditing purposes.

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

(1) Work was authorized and approved.

(2) Work stayed within the authorized boundaries.

(3) Post work/maintenance testing was accomplished satisfactorily.

(4) Appropriate Quality Assurance Forms are included to document Certification of Maintenance, and all forms are completed with required signatures.

f. All testing of the FBW SCS Boundary shall be verified closed prior to the system being released for unrestricted use/Fast Cruise/Sea Trials.

g. As a policy, CWPs/TGIs/ripouts for work within the SFCC Boundary or test documents within the FBW SCS Boundary shall not be closed out until resolution of all actions necessary to verify certification has been maintained when any breach of the boundary has occurred. An acceptable alternative, however, is to close out a CWP/TGI/ripout or test documents within the FBW SCS Boundary by transferring remaining at sea testing actions to a separate auditable accountability system (e.g., Sea Trial Agenda). All CWPs/TGIs/ripouts closed in this manner shall be annotated by the activity with the reference documents that contained the transfer actions. This policy shall be verified by the activity accomplishing the work, supervising authority, submarine Commanding Officer and Immediate Superior In Command (ISIC).

h. Closed TGIs/CWPs/ripouts shall be retained by the work accomplishing activity and are subject to audit by cognizant activities (Type Commander, ISIC, shipyard, supervising authority or NAVSEA) during audits such as functional or certification audits.

i. Maintain records in accordance with Volume V, Part I, Chapter 10 of this manual.

34.2.4 Upgrades/Alteration Requirements. Upgrades/alterations within the FBW SCS Boundary or SFCC Boundary shall follow the same design and test requirements called out in Section 4 of reference (a) for initial system design. Proposals for upgrades or alterations within the FBW SCS Boundary shall identify the extent of system retest required based on the proposed changes to the FBW SCS baseline design. Anything less than that required for initial system acceptance testing shall be justified in the change proposal for disposition during the change proposal approval process.

a. All proposed upgrades to submarine FBW SCS and components shall be prepared, submitted and approved in accordance with references (b) or (c).

b. Submarine FBW SCS software upgrades and alterations impacting hardware and software components within the SFCC Boundary shall only be performed by the submarine class FBW SCS Software Support Activity assigned by the Submarine Program manager. Software upgrades impacting safety critical software units within the SFCC Boundary shall require conduct of a system safety analysis to identify potential new safety critical functions and data elements. To ensure the baseline software safety pedigree has not been compromised by the change, safety critical software components shall be analyzed using safety analysis checklists tied to the initial system design safety analyses. All safety related Priority 3 and higher Problem Trouble Reports or non-conformances, as defined in reference (a), shall be adjudicated prior to system certification.

c. Major repair work performed within the SFCC Boundary shall only be performed by the FBW SCS ISEA or maintenance activity under the direction of the ISEA. Major repair work within the FBW Boundary can be performed by another maintenance activity other than the ISEA using existing maintenance procedures and drawings from the submarine class maintenance plan. Otherwise, the maintenance activity shall seek guidance from the ISEA prior to performing work.

d. Upgrades/alterations or major repair work within the SFCC Boundary shall be performed by the ISEA or an activity under the direction of the ISEA using CWPs or equivalent as identified in reference (a). Completion of work performed shall be verified by ensuring all CWPs or equivalent procedures are closed, or that outstanding liabilities are transferred to a separate auditable accountability system per reference (a).

e. Testing shall be carried out in accordance with class specific system maintenance documentation or as identified by the ISEA for major repair work, and as part of the upgrade/alteration installation documentation (e.g., Ship Alteration or Engineering Change) developed in accordance with references (b) or (c). The class specific system maintenance documentation corrective maintenance sections and FBW SCS upgrade/alteration installation documentation must specify when applicable portions of Unrestricted Operations/Maintenance Requirement Card 019 operability verification testing is to be completed. Following installation of the FBW SCS upgrades/alterations, major repair work, at sea testing/Sea Trials shall be planned and conducted in accordance with Section 4 of reference (a) when required by the upgrade/alteration installation documentation test procedures or determined necessary by the Submarine Program Manager with NAVSEA 05 concurrence. Following completion of all installation and test activities, the installing activity shall notify the ship, ISIC, TYCOM, and NAVSEA by naval message (Appendix G) of reference (a) that the system is satisfactory for unrestricted use. This message will also identify any operating restrictions of the ship and/or system and any submarine FBW SCS non-conformance with conditions until disposition in accordance with Section 3 of reference (a).

34.2.5 Material Control Requirements. The requirements associated with SFCCs are designed to ensure the correct components are installed in FBW SCS subassemblies that process flight critical functions and that those SFCCs are traceable to records of Objective Quality Evidence. They provide for the procurement, receipt inspection, storage, installation, and verification of SFCCs during construction, conversion, overhaul, repair, and alteration of Naval ships. These requirements are contained in reference (a) and are described in Volume V, Part I, Chapter 6 of this manual.

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VOLUME VI

CHAPTER 35

FOR FUTURE USE

VOLUME VI

CHAPTER 36

SURFACE FORCE SHIP/AIRCRAFT CARRIER MODERNIZATION PROGRAM

REFERENCES.

(a) OPNAVINST 4720.2 - Fleet Modernization Program (FMP); Policy For
(b) NAVSEA SL720-AA-MAN-030 - Navy Modernization Process Management and Operations Manual (NMP-MOM)
(c) CLF/CPFINST 4720.3 - Management of Afloat Combat Systems and C4I Installations and Improvements
(d) DODINST 5000.2 - Operation of the Defense Acquisition System

LISTING OF APPENDICES.

A Modernization Plan Flowchart
B Ship Change Document Template
C Technical Assessment Flowchart
D Cost Benefit Analysis Flowchart
E Alteration Figure of Merit Flowchart
F Voting Database Flowchart

36.1 SCOPE. This chapter is applicable to all Surface Force/Carrier Force ships and shore activities involved in ship modernization. The provisions of this chapter have been developed in collaboration with Naval Operations (OPNAV). Where there are conflicts with references (a) and (b), this chapter shall take precedence until such time as OPNAV implementing directives can be modified/issued. References (c) and (d) govern the management of afloat Combat Systems and Command, Control, Communications, Computers, Collaboration and Intelligence installations and improvements, and Initial Adversary Vulnerability Assessment policies and remain in effect as written. Type Commander (TYCOM) Maintenance Directorates shall be the lead for ensuring implementation. Ships will continue the current practice of forwarding change requests to the Immediate Superior In Command (ISIC), who will forward the change request to the respective TYCOM for entry into the Navy Data Environment (NDE). Only alterations entered in NDE will be considered for inclusion in Modernization Programs. This chapter is not applicable to submarines. Submarines will continue to utilize existing instructions.

36.2 PURPOSE. The purpose of this chapter is to document the Surface Force Ship/Aircraft Carrier Modernization Program, which emphasizes early decisions under the control of United States Fleet Forces Command (USFFC), Pacific Fleet, and Navy Cyber Forces (CYBERFOR), and expands on the decision process for deciding which alterations and modifications will be developed, procured, certified and installed on all surface force ships and aircraft carriers. The objective is to assure that fleet modernization investments address the fleet's greatest concerns and are integrated and prioritized across Strike Groups, ships, systems and warfare areas. The process directly involves Navy leadership at all levels (Fleet, OPNAV, Force TYCOMs, Systems Commands (SYSCOM) and Program Executive Offices (PEO)) in the programming, planning and installation of modernization in a consistent and disciplined manner.

36.3 BACKGROUND. The End to End Ship Maintenance and Modernization (previously Ship Maintenance (SHIPMAIN)) was developed to concentrate on the early decision process regarding which alterations are to be accomplished. This process provides timely Fleet involvement and the assurance that changes are driven by current fleet requirements. The Modernization Program itself was implemented to modify the Entitled Process (formerly the Fleet Modernization Program (FMP)) due to Fleet concerns which included alterations developed and hardware procured but never installed. It was to also alleviate concerns over significant changes to availability work packages after authorization letter issuance, and alteration installation problems caused by failure to satisfy planning milestones. While these issues are often times driven by overall funding instability in Navy budgets and changing priorities, the associated costs consume modernization funding minimizing the ability to modernize. The Navy Modernization Process (NMP) has replaced the FMP, and is documented in reference (b). The NMP provides a structure for the orderly identification, approval, design, planning, programming, budgeting, installation, life cycle

support and configuration control of technical and survivability improvements to all ships of the active and reserve fleets. This chapter also provides overall prioritization in the alterations to be accomplished and discipline and accountability in the adherence to NMP processes.

36.4 PROCESS. Appendix A provides a flowchart of the entitled modernization process decision and prioritization.

36.4.1 Key Elements. Key elements of the Ship/Carrier Modernization Program are:

a. A single process to identify, evaluate and approve all hardware and computer software modifications to all ships and ship's systems. The process is based on approved business rules and is owned by the Force TYCOMs Commander Naval Surface Forces/Commander Naval Air Forces (COMNAVSURFOR/COMNAVAIRFOR). The process operates in concert with Acquisition Program processes of reference (c).

b. Consolidation of all alterations into two types:

(1) Fleet alterations funded by the Fleet.

(2) Program alterations funded by the SYSCOMs/PEOs.

c. A four-phase process (Preliminary Analysis, Concept Design, Design Development, Ship Integration) supported by Decision Points at the end of Phases I-III. Senior Fleet/OPNAV personnel comprise the Decision Boards identified in paragraph 36.6 of this chapter. Provisions exist to combine Phases II and III for less complex changes as delineated in paragraph 36.4.8 of this chapter. Any major changes encountered during Ship Integration will require reporting back to Decision Point 3 for approval to continue the Ship Change.

d. A single NDE database, maintained by Naval Sea Systems Command (NAVSEA) 04. The Ship Change Document (SCD), which replaces the Justification Change Form, Ship Alteration Record, in service Engineering Change Proposal and all other alteration documents used in the FMP, will be entered and tracked in NDE from inception through installation in the last applicable ship. Appendix B illustrates the SCD template. This SCD is a living document and may not look the same in NDE. Only SCDs entered in NDE will be considered for inclusion in modernization plans for specific hulls.

e. Involvement of Fleet, OPNAV, TYCOMs, SYSCOMS and PEOs in the decision making process, utilizing three boards of stakeholders at the O-6, one and two star Admiral, and three star Admiral level. Voting members of the boards represent appropriate Fleet and OPNAV organizations. SYSCOM and PEO representation is included to validate the readiness of the alteration to proceed to the next step. Paragraph 36.5.2 of this chapter addresses the business rules associated with the voting process. Depending on cost and impact thresholds, decisions are made by one of the three boards. An electronic voting capability (eVote), embedded in NDE, will be used on a continuing basis to facilitate timely action by the boards, and minimize the need for boards to formally convene. NAVSEA 04 will ensure data is available to voting members 10 to 14 days prior to required voting. As noted on the Modernization Flow Chart, Appendix A of this chapter, Technical Assessments are conducted at three points in the process, and in conjunction with the Alteration Figure of Merit (AFOM) and Cost Benefit Analysis (CBA) blocks, are assembled in a Recommended Change Package (RCP) which provide the basis for decisions made by the O-6, 1/2 Star and 3 Star Boards.

(1) The O-6 level board approves Fleet alterations except in cases where the scope and complexity dictate referral to a higher level board, makes the majority of decisions involving the lower cost and lesser impact Program alterations, and provides recommendations for the higher level boards.

(2) The one and two star board validates the O-6 board decisions and provides Fleet/OPNAV/claimant recommendations to Acquisition Category (ACAT) III and ACAT IV and below program milestone decision authorities.

(3) The three star board sets overall priorities, makes the decisions involving the higher cost and higher impact alterations, validates one and two star board decisions, provides Fleet/OPNAV/claimant recommendations to ACAT I and ACAT II program milestone decision authorities, and approves the Ship/Carrier Modernization Pre-Overseas Movement (POM) Submission (Capability Plan).

f. The Modernization process is designed to accommodate initial submission of an SCD early in the life of requirements definition for a ship or system capability/program. This is accomplished by submitting an SCD for the system/program across the Five Year Defense Program (this includes all software support programs). As changes are more definitively identified, separate SCDs will be developed as supportive to the capability/program SCD (examples of supportive SCDs can include hardware updates, software upgrades, Hull, Mechanical and Electrical (HM&E) changes, etc.).

36.4.2 Decision Points. There are three main decision points exercised by the review boards (Steps 60, 140 and 220 of Appendix A); and all three are supported by technical assessments, cost benefit analyses and figure of merit assessment reviews.

a. Decision Point 1: The purpose of Decision Point 1 is to approve the entry of the concept design and to include the proposed change in the Modernization Plan. Approval at this point constitutes Resource Sponsor commitment to fully fund the change in the POM. It is recognized that follow-on budget decisions beyond the control of the Resource Sponsor may require relief from that commitment, however, the Resource Sponsor will then advise the Voting Boards for consideration of the change in future budgets. Some programs/capabilities may not be defined to the alteration level based on the need for further technical definition. In those cases, the program/capability will be submitted as a single SCD for consideration at Decision Point 1. In Phases II and III, the program/capability will be defined in multiple alterations as required.

b. Decision Point 2: The purpose of Decision Point 2 is to validate/update the Modernization Plan and to proceed with design development, with Resource Sponsor confirmation that funds exist in the budget to fully execute the Ship Change.

c. Decision Point 3: The purpose of Decision Point 3 is to validate/update the Modernization Plan and to proceed with material procurement and scheduling installations with Resource Sponsor confirmation that funds exist in the budget to fully execute the Ship Change.

36.4.3 Ship Change Document. The principal document used in the Technical Assessments is the SCD, illustrated in Appendix B, which remains with an alteration throughout its development. The SCD replaces the Justification Cost Form, In-service Engineering Change Proposal, the Ship Alteration Record and all other alteration documents (e.g., Field Change, Ordnance Alteration) which were used in the former FMP. The SCD is prepared by any activity and must meet specific minimum requirements addressed in paragraph 36.5 of this chapter, in order to proceed beyond Block 10. After the SCD is prepared it is forwarded to an authorized submitting activity for entry into NDE. For SCDs submitted as described in paragraph 36.4.1 of this chapter, all cost information shall be complete and cover the entire program. A submitted supportive SCD's costs will be decremented from the capability/program SCD. Authorized submitting activities are:

a. TYCOMs.

b. OPNAV.

c. PEOs.

d. Participating Acquisition Resource Managers (PARM).

e. Life Cycle Managers.

f. Fleet Commanders.

36.4.3.1 Phase I. The Phase I steps consist of:

a. The initiator shall provide data for all SCD Phase I fields at a minimum prior to submission to the submitter.

b. A preliminary tracking number shall be automatically assigned by the system (NDE).

c. The initiator and the submitter shall have the ability to review the draft SCD at any time in the preparation process.

d. This form shall be able to be viewed at any point in the process once submitted.

e. Minimum header data required uniquely defining the Configuration Change (functional definition, class affectivity, functional areas).

f. Fleet requirement, description of change, and impact to the Fleet if not accomplished.

g. The submitter will either approve the change and put into NDE officially or kill the change. Entering an SCD at this point establishes that the SCD has officially entered the Entitled Process.

h. The submitter will ensure there are no duplicate SCDs.

i. The submitter shall be able to expedite Alterations that are considered to be critical by Fleet by setting an "Expedite" flag in SCD. Expedited SCDs are considered first in any process work queue.

j. The submitter shall be able to identify previously shelved alterations and resubmit to the process using previously assigned SCD identification via TYCOM or OPNAV Sponsor.

k. The expedite alert box should be checked "yes" when operational readiness (i.e., correction of a C4 Casualty Report) or safety to personnel is effected.

l. All authorized SCDs shall be assigned a sequential Ship Change Number by the system (NDE).

NOTE: THE PROCESS ENABLES LESS COMPLEX CHANGES TO COMBINE PHASES II AND III, AS DETERMINED IN THE INITIAL TECHNICAL ASSESSMENT.

36.4.3.2 Phase II. The Phase II steps consist of:

a. The Submitter receives approval of SCD Phase I and notification to complete SCD Phase II or IIa, if approved by Voting Board, form.

b. The submitter will utilize internal processes to complete preliminary engineering and provide a draft SCD Phase II to the Change Manager in the respective Ship Program Manager Office.

36.4.3.3 Phase III. The Phase III steps consist of:

a. Submitter receives approved SCD Phase II.

b. The submitter will utilize internal processes to complete engineering and design development and provide a draft SCD Phase II (a) or III.

36.4.4 Technical Assessment Teams. Technical Assessment Teams (TAT) are assigned at NAVSEA and will be made up of subject matter technical experts related to the scope of the SCD.

36.4.4.1 Technical Assessments. Technical Assessments are performed at three separate stages in the process to support decisions to complete preliminary engineering, design development and detail specifications.

36.4.4.2 Technical Assessment Business Rules. Appendix C reflects the Technical Assessment flowchart.

36.4.4.3 Phase I Technical Assessment Rules. The following Phase I Technical Assessment Business Rules apply:

a. Ship's Program Manager (SPM) cannot send a change idea to history.

b. TAT review process will take no longer then 5 days.

c. Any negative recommendation must include a justification.

d. Due to limited engineering requirements and limited impacts to existing equipments and the ships, some changes may be permitted to have Phase II and Phase III combined. In order to determine if there is sufficient reason to combine these two phases for a particular change, the TAT must consider the Scope (SCD Phase I, Item 3.a) of the change.

36.4.4.4 Technical Assessment Teams. TATs will be allowed to change fields to correct data. If any information is changed a record of the change will be kept and the submitting Point of Contact notified for concurrence.

36.4.4.5 Changes. Identify changes that may supersede or be redundant with an existing change. Should the SPM require additional clarification, endorsement will not be forwarded prior to attempting issue resolution via TAT Lead. Unresolved issues will be noted in the Technical review comments and forwarded.

36.4.4.6 Phase II Technical Assessment Rules. Should the SPM require additional clarification, endorsement will not be forwarded prior to attempting issue resolution via TAT Lead. Unresolved issues will be noted in the Technical Assessment comments and forwarded. TAT will take no longer than 45 days to complete.

36.4.4.7 Phase II(a) Update Technical Assessment. In this phase, complete technical data will be available for review in the draft Phase II(a) SCD. Phase II(a) will combine Phases II and III in order to streamline the process. The same basic tenets of the process described for Phases II and III will apply. The TAT will complete their review within 60 days.

36.4.4.8 Phase III Technical Assessment Rules. In this phase, complete technical data will be available for review in the draft Phase III SCD, but the basic tenets of the process described for Phases I and II will apply. TAT will complete their review in this phase in no more than 60 days.

36.4.5 Cost Benefit Analysis. A CBA is conducted at step 40 of the process, and then updated at steps 120 and 200, to support Modernization Plan decisions by the three established review boards. Appendix D reflects the Cost Benefit Analysis Flowchart. It is imperative that sound cost estimates be developed to make these analyses valid. The CBAs, the Technical Assessments and AFOM assignments together form the RCP which are provided to the respective review boards to support board decisions on proposed shipboard changes. These analyses are accomplished by Independent Cost Review (ICR) Teams under the direction of NAVSEA 017. All cost data to support the CBA process is derived from the SCD, initially submitted by the activity proposing the change, and then updated throughout the process.

36.4.5.1 Phase I Preliminary Analysis Business Rules. In this phase, the purpose of the ICR Team is to review cost data entered in the SCD for completeness and reasonableness to support Decision Point I. The input to the CBA process is an affirmative designation by the Technical Analysis Team. In this phase, the ICR Team is expecting high-level cost information (e.g. Concept Development Cost, Preliminary Engineering Cost, Design Development Cost, Procurement Cost and Installation Cost). This cost data will be provided by responsible PARMs and SPMs as direct inputs into the SCD resident in NDE. NDE maps this data into a Cost Reduction and Effectiveness Improvement (CREI) document designated as the CREI Template which automatically calculates cost metrics such as Return on Investment, Net Present Value (NPV) and Payback Period. When the calculations have been made by the CREI Template, a notification is electronically forwarded to Subject Matter Expert (SME) members of the ICR Team. The cost data fields in NDE will be locked precluding uncontrolled changes and can only be unlocked by a member of the ICR Team. If the ICR Team has questions about the data, they will be provided back to the data source through a “feedback” loop managed by NAVSEA 017. The feedback process will only be exercised one time (if necessary), and will then be forwarded to the Decision Board for their review and decision. The ICR Team will not alter cost data; but will use the feedback loop as the conduit for questioning submitted cost data. Should the source of the cost data determine a change to submitted cost information is warranted based on ICR Team questions, he/she will enter the corrected data in NDE after consultation with the NAVSEA 017 Area Coordinator. The Area Coordinator will obtain concurrence from respective ICR Team members and unlock applicable cost data fields. The source of the cost data will have two (2) working days to make the change to appropriate fields, at which time the fields will again lock and the data passed to the RCP and review by the appropriate board. In those instances where the source of the cost data does not agree with changes proposed by the ICR Team, the unaltered data will be forwarded for inclusion in the RCP as well as the ICR Team comments.

36.4.5.2 Phase II Concept Design Cost Benefit Analysis Update. In this phase, the ICR Team is looking for more fidelity in the cost data provided to support Decision Point 2. The basic CBA Process in this phase mirrors Phase I, with the following exceptions/additions:

a. If the Program Manager (PM) experiences cost growth of greater than 10% in the total program budget, the PM shall notify the appropriate Sponsor (Fleet or OPNAV). The Sponsor may decide to address this issue with the Decision Board.

b. The Sponsor shall be notified if, in the year of execution, a cost shortfall identified that is within the Program Managers ability to cover, or adjustments are made to the Modernization Plan.

c. If the total cost estimate of an alteration exceeds the appropriate threshold for the respective phase (i.e. 40% Phase I, 25% Phase II, 15% Phase III), the PM shall notify the appropriate Sponsor (Fleet or OPNAV). At that point, the Sponsor may decide to address the issue with the Decision Board.

36.4.5.3 Phase III Design Development Cost Benefit Analysis Update. In this phase, the ICR Team is expecting detailed cost data to be available to support Decision Point 3, however, the basic CBA Process mirrors that conducted in Phases I and II.

36.4.6 Alteration Figure of Merit. The AFOM is used in concert with the Technical Assessment and the CBA to form the RCP, which is provided to and forms the basis for the Board Decisions. The AFOM is initially calculated prior to Decision Point 1, and then updated to support Decision Points 2 and 3. The AFOM is defined as the quantitative "War Fighting or Readiness Benefit" assigned to each proposed alteration. Appendix E reflects the AFOM Flowchart. Fleet and OPNAV members of the 3-Star Board weight this structure annually, on or about October of the fiscal year, using United States Fleet Forces Command guidance which is based on numbered Fleet and TYCOM Integrated War Fighting and Readiness priorities and additional inputs from the Chief of Naval Operations (CNO) Campaign Analysis and Sea Trials processes. There are two components to the process of assigning AFOMs to each SCD:

a. The annual establishing of weights based on Fleet priorities.

b. The continuous action by respective TYCOMs to assign index values to standardized rating scales that address:

(1) Suitability (Reliability, Maintainability, Operational Availability, Supportability, Safety).

(2) Quality of Service/Quality of Life (QOS/QOL).

(3) Capability.

Separate from this annual event, TYCOMs continue to review and assign index values to the previously noted standard rating scales for each change as part of the throughput of SCDs. COMNAVSURFOR/COMNAVAIRFOR will rate each proposed alteration using established rating scales and Fleet Staff SME recommendations to calculate the AFOM through a Flag-weighted algorithm that resides in NDE. The TYCOM Rating Scale Index Value assignments are entered in NDE and calculated to provide an overall AFOM and nested AFOMs that articulate the change benefits of Capability, Suitability and QOS/QOL to the Entitled Process Decision Board members.

36.4.7 Annual Assignment of Weights. The annual assignment of weights is a key component of the AFOM assignment and ensures the AFOM process remains current with Fleet/Navy priorities. The weights are the foundation of the algorithm in NDE which calculates the AFOM assignment for each alteration.

a. The Entitled Process 3 Star Board shall annually determine the numerical weights of the Naval Power 21-based AFOM Benefit Structure using the Merit Assessment Questionnaire. The determination of AFOM Benefit weights will be executed using a pair-wise mathematical analysis tool. Each Entitled Process Fleet 3 Star Board member indicates his/her preferences using the formatted pair-wise questionnaire provided in the Merit Assessment Questionnaire.

b. Respective TYCOMs will continue to review and assign initial AFOMs as dictated by the throughput of SCDs, using SMEs from activities in the area associated with each SCD. Each SCD that successfully completes the Technical Assessment block in each phase is mapped by the submitter in NDE by Naval Capability and routed to cognizant TYCOMs. The TYCOMs will canvass appropriate SMEs for input, providing relevant TYCOM-generated questions to the SME to assist in their review. Using these questions, the TYCOM SME representative will review the information listed in the SCD and will provide inputs back to the TYCOM by recommending the Index values associated with the AFOM Benefit Structure Rating Scales discussed earlier. The TYCOM will review inputs and enter the final Index value in NDE. NDE will aggregate TYCOM inputs and automatically calculate or recalculate the AFOM based on the algorithm which reflects the weights described above. This process is replicated in each of the first three phases (Preliminary Analysis, Concept Design, Design Development) to support the three decision points. An overall AFOM score and a breakout of AFOM by Capability, Suitability, QOS/QOL and each of the four Naval Power 21 Capabilities (Sea Base, Sea Strike, Sea Shield, ForceNet) will be included on the RCP.

36.4.8 Combining of Phases. Guidelines for combining of Phases II and III:

a. If the Scope is Internal Equipment Modification, all of the following criteria must be met:

(1) The change can be accomplished without changing an interface external to the equipment or system.

(2) The change is made within the equipment or system.

(3) The change does not negatively impact Strike Force Interoperability.

(4) The change does not impact shipboard distributive systems (i.e., water, ventilation, electrical, power, etc.), Ship Selected Records or interfacing equipment or systems, compartmental arrangement records or Damage Control records.

b. If the scope is Ship Modification all of the following criteria must be met:

(1) The change does not negatively impact Strike Force Interoperability.

(2) The change does not impact ship's stability records (weight & moment).

(3) The change does not impact or alter the 3-dimensional footprint of the equipment being replaced.

(4) The change does not impact shipboard distributive systems (i.e., water, ventilation, electrical, power, etc.), Ship Selected Records or interfacing equipment or systems, compartmental arrangement records, or Damage Control records.

(5) The change does not impact manning levels.

c. If all of the guidelines listed above are met, the technical assessment team may recommend Phases II and III be combined.

d. If the Phase I O-6 Board determines Phases II and III can be combined, then both Phases II and III of the SCD must be completed before going to the Decision Point 3 O-6 Board.

e. Duration of Alteration is designated as a Non Permanent Installation (Previously termed Temporary Alteration). **These changes will include prototypes, proof-ins and current TEMPALTS**. This type of change will adhere to the following guidance:

(1) A non-permanent install will start in Phase I and must be approved at Decision Point 1. After Decision Point 1, the change will proceed to SCD Phase II for concept design.

(2) During concept design a Ship Change Data Package, including Plan of Action and Milestones, will be prepared and the proposal sent through the review process to Decision Point 2 for approval to install.

(3) Approval at Decision Point 2 constitutes approval to install the non-permanent installation. At the completion of the authorized install period the change will either be:

(a) Removed and all documentation forwarded to the review teams and Decision Point 3 to inform all parties of the results.

(b) Make install permanent by forwarding results and Phase III SCD reflecting the need to make the change permanent and to install on other platforms.

(4) Installation will be onboard for **pre-specified amount of time not to exceed** one deployment cycle or one (1) year.

(5) Sponsoring Activity may utilize internal process to complete preliminary engineering and provide a draft Phase III SCD to the SPM Change Manager, or the SPM may task the Planning Yard to develop a Phase III SCD.

(6) Sponsoring Activity shall provide required documentation (e.g., ICDs) to support completion of the Phase III SCD.

(7) Plan of Action and Milestones required for equipment development.

f. If all of the guidelines listed above are met, the technical assessment team may recommend Phases II and III be combined.

g. If the Phase I O-6 Board determines Phases II and III can be combined, Phases II and IIa of the SCD must be completed before going to the Decision Point 3 O-6 Board.

36.5 VOTING RULES.

36.5.1 Voting Database Rules. The principal document in the voting process is the RCP. The RCP is prepared electronically in NDE, and presents information from the Technical Assessment, AFOM, and CBA. While the RCP provides summary information, the capability exists to drill down to view more detail from the Technical Assessment/AFOM/CBA. The three Decision Boards mentioned in paragraph 36.6 of this chapter will be in place to approve RCPs and authorize SCDs to proceed to the next phase of the process. NDE will be the single authoritative database for Ship Modernization and will support the entire process, from alteration inception through installation of the alteration. NDE will include an electronic voting capability (eVote) to enable Decision Boards to convene virtually and on a continuous basis.

36.5.2 Initiate Ship Change Document Business Rules. The SCD will initially capture the basic idea and associated cost and mission capability information, but will be updated with more detailed information as the change matures through the process. The initiator of the change will prepare the SCD and forward to the organization, in their chain of command, authorized to submit the SCD into NDE (e.g., TYCOMs, OPNAV, PEO, PARM/Life Cycle Managers). The appropriate technical authority will be assigned at NAVSEA and will be responsible for providing updated data in the SCD to support the process through final disposition of the change.

36.6 DECISION BOARDS. The three decision points in the process (i.e., Authorize and Fund Preliminary Engineering, Design Development and Procurement/Installation) are accomplished through the three Decision Boards (O-6, 1/2 Star, 3 Star). These decisions feed the POM/Budget process to create and sustain a fully funded ship Modernization Plan (MP). A positive decision at Decision Point 1 constitutes Resource Sponsor commitment to fund the alteration through development and final installation. Appendix F reflects the Decision Point Flowchart. For each alteration the Technical Assessment, AFOM Assignment and Cost Benefit Analysis are completed prior to each decision, and aggregated in a RCP to be considered by the voting boards. The RCP will be available on a read only basis in NDE for review by SPM/PM/PARM personnel prior to consideration by the boards. NDE will provide for electronic workflow such that SCD processing up to and including voting by board members can be done virtually. While the boards will operate in a hierarchical mode where decisions made at a lower level board will be validated by the senior board, the following thresholds are established for approval authority:

a. O-6 Board- < $50M Total Cost

b. 1/2 Star Board $50-200M Total Cost

c. 3 Star Board > $200M Total Cost

36.6.1 Board Specific Rules. The following specific rules apply to each Board:

a. O-6 Review Board

(1) Shall meet continuously on a virtual basis and consider all RCPs. For items that are outside their fiscal threshold ($50M total program value) they make recommendations to higher boards.

(2) All members have the opportunity to vote on all RCPs.

(3) Concur or non-concur with recommendation to expedite.

(4) Concur or non-concur with recommendation to go to Phase IIA.

(5) Voting process will be achieved within the following timelines:

(a) 5 working days to vote.

(b) 5 working days to adjudicate funding issues (associated with Funding Concurrence-resource identification). If resource sponsor fails to provide acceptable trade-off, the board has the authority to approve in accordance with SCD.

b. 1-2 Star Review Board

(1) Will meet monthly to review Modernization Plan and to consider forwarded RCPs that fall within their monetary threshold (>$50M and <$200M total program cost).

(2) Concur or non-concur with recommendation to expedite.

(3) Concur or non-concur with recommendation to go to Phase IIA.

(4) Voting process will be achieved within the following timelines:

(a) 20 working days to vote.

(b) 5 working days to adjudicate funding issues (associated with Funding Concurrence-resource identification). If resource sponsor fails to provide acceptable trade-offs, the board has the authority to approve in accordance with SCD.

c. 3 Star Review Board

(1) Will meet quarterly to review Modernization Plan and to consider forwarded RCPs that fall within their monetary threshold (above $200M total program costs).

(a) Approve/disapprove 1-2 Star Board recommendations.

(b) Voting process will be achieved within following timelines:

1 60 days to vote.

2 5 days to adjudicate funding issues (associated with Funding Concurrence-resource identification). If resource sponsor fails to provide acceptable trade-offs, the Board has the authority to approve in accordance with SCD.

(2) Submits annual Modernization Plan to OPNAV N7.

36.7 APPROVAL FOR FLEET ALTERATIONS. Approval for Fleet Alterations shall be via official TYCOM Letter of Authorization at A-12, and entered into NDE. Alterations shall not be authorized for installation unless included in NDE. The TYCOM shall establish Fleet Alteration funding policies for each fiscal year by defining a "fleet modernization control" (i.e. a specified percent of the maintenance budget set aside for Fleet Alteration modernization). Resource sponsor (OPNAV N43) approval to fund alterations that result in exceeding the fleet modernization control will require offsets to be identified to keep the fleet modernization control at the specified level/percentage. If offsets cannot be identified, it will be the responsibility of the TYCOM to increase the fleet modernization control within the constraints of the maintenance budget (i.e. increases to the fleet modernization control will be offset by decreasing the amount of the maintenance budget allotted for maintenance).

36.8 EXECUTION YEAR CHANGES TO MODERNIZATION PLANS. It is expected this process will minimize changes during the execution year. Operational priorities may require some changes after the approved Modernization Plan has been submitted with the annual President's budget submission to Congress. Execution year changes to the approved Modernization Plan will be limited and only as approved by the Voting Boards in accordance with fiscal statutes and regulations.

36.9 METRICS. A goal of the Ship Modernization Program is to instill discipline in the process, ensuring stability from alteration inception through final installation, minimizing deficiencies. To support this stability a number of business rules have been established within this chapter. The metrics established are used by all levels of the chain of command to measure the process, determine what barriers exist in the entitled process and to predict downstream milestone attainment. Metrics are not to be used to measure performance of individuals. Any methods employed to circumvent collection of valid metrics are counterproductive, mask real process improvement, and often create more work for Maintenance Team members. From a process improvement standpoint, it is far preferable to miss a metric milestone based on good business decisions rather than to work around the process measures to avoid the "hit". Examples of undesirable actions:

a. Cancellation of an aged, unscreened job with subsequent production of a new identical job for the sole purpose of avoiding a high cycle time.

b. Having the ship re-upline a Maintenance and Material Management Maintenance Action Form (2-Kilo) with desired changes, knowing it will over write the shore file, rather than taking the First Pass Yield (FPY) hit and changing the original 2-Kilo.

c. Not making needed changes to a 2-Kilo before screening it to a planning activity just to avoid an FPY hit.

d. Utilizing the date the 2-Kilo is written and uplined as the "when discovered date" vice the date the deficiency was actually discovered in order to avoid a high ship to shore cycle time.

36.9.1 Evaluation. The five selected metrics below will be used to evaluate the Ship Modernization Program processes. Regional Maintenance Center (RMC) Commanders will report metric measurements to Commander, Navy Regional Maintenance Center monthly. This reporting requirement allows process efficiency and effectiveness collaboration between SEA04 and Commander, Navy Regional Maintenance Center where required, impacting process preplanning and execution during Maintenance and Modernization overlap.

36.9.1.1 Process Effectiveness. For all alteration installation completions, determine if it was accomplished in the same fiscal year as called for in the Modernization Plan developed during the most recent POM cycle. (Example: The Modernization Plan used as the baseline for this metric will be set by POM06 for Fiscal Year (FY)06 and FY07 and set by POM08 for FY08 and FY09.) Metric data will be collected and analyzed monthly with Fleet and Program alterations plotted separately. This same data will be tallied by SYSCOM on an annual basis.

CALCULATION:

1. $\frac{\text{Total \# of Fleet Alterations completed as per the Modernization Plan schedule}}{\text{Total \# of Fleet Alterations completed}}$

2. $\frac{\text{Total \# of Program Alterations completed as per the Modernization Plan schedule}}{\text{Total \# of Program Alterations completed}}$

a. Source Data and Reporting Frequency for Measurement. All data used for this metric shall come from Navy Data Environment-Navy Modernization (NDE-NM). A separate monthly tally of Fleet and Program alterations installed in accordance with the Modernization Plan will be plotted to provide a trend on the "effectiveness" of the process.

b. Basis for Baseline: Since this metric is based solely on the entitled process, the baseline will be established after 12 months of data collection.

c. Required NDE Fields:

(1) Alteration Identifier.

(2) Alteration Type (Fleet or Program).

(3) Installation FY from most recent POM cycle.

(4) Actual completion FY.

36.9.1.2 Process Efficiency. The process efficiency is the percentage of planned installation dollars that were actually expensed. Comparison of the planned installation dollars to the actual cost of installations performed. For all alteration installation completions, determine if it was accomplished for the estimated cost as provided in the Modernization Plan developed during the most recent POM cycle. (Example: The Modernization Plan used as the baseline for this metric will be set by POM06 for FY06 and FY07 and set by POM08 for FY08 and FY09.) Metric data will be collected and analyzed monthly with Fleet and Program alterations plotted separately.

CALCULATION:

1. $\frac{\text{Total estimated cost of Fleet Alterations completed as per the Modernization Plan schedule}}{\text{Total actual cost of completed Fleet Alterations}}$

2. $\frac{\text{Total estimated cost of Program Alterations completed per the Modernization Plan schedule}}{\text{Total actual cost of completed Program Alterations}}$

a. Source Data and Reporting Frequency for Measurement. All data used for this metric shall come from NDE-NM. A separate monthly tally of Fleet and Program alterations installed in accordance with the Modernization Plan will be plotted to provide a trend.

Source Data: NDE-NM

b. Basis for Baseline. Since this metric is based solely on the entitled process, the baseline will be established after 12 months of data collection.

c. Required NDE Fields:

(1) Alteration Identifier.

(2) Alteration Type (Fleet or Program).

(3) Installation cost estimate from most recent POM cycle.

(4) Actual installation completion cost.

36.9.1.3 First Pass Yield. For all SCDs, keep a count of how many are being reviewed for the first time at each major decision point and of these how many are "approved". "Approved" are those that are not "killed" or sent back for rework. Metric data will be collected and analyzed monthly and tallied by SYSCOM on an annual basis.

CALCULATION:

a. FPY 1 (Decision Point 1 - "Authorize Fund Preliminary Engineering")

$$\frac{\text{Total \# of SCDs being reviewed for the first time and approved at Decision Point 1}}{\text{Total \# of SCDs being reviewed for the first time at Decision Point 1}}$$

b. FPY 2 (Decision Point 2 - "Authorize Fund Design Development")

$$\frac{\text{Total \# of SCDs being reviewed for the first time and approved at Decision Point 2}}{\text{Total \# of SCDs being reviewed for the first time at Decision Point 2}}$$

c. FPY 3 (Decision Point 3 - "Fund Procurement & Installation")

$$\frac{\text{Total \# of SCDs being reviewed for the first time and approved at Decision Point 3}}{\text{Total \# of SCDs being reviewed for the first time at Decision Point 3}}$$

d. FPY 4 ("Ship Change (SC) Ready to Install")

$$\frac{\text{Total \# of SCDs being reviewed for the first time and Ready to Install (Block 270)}}{\text{Total \# of SCDs being reviewed for the first time at "SC ready to install"}}$$

36.9.1.4 Productivity. For all SCDs, keep a count of how many are approved at each major decision point. Metric data will be collected and analyzed monthly, and tallied by SYSCOM on an annual basis.

CALCULATION:

1. Total number of alterations approved at Decision Point 1 "Authorize Fund Preliminary Engineering"
2. Total number of alterations approved at Decision Point 2 "Authorize Fund Design Development"
3. Total number of alterations approved at Decision Point 3 "Fund Procurement & Installation"
4. Total number of alterations approved at "SC ready to install" point

a. Source Data and Reporting Frequency for Measurement. All data used for this metric shall come from NDE-NM. Each SCD is assigned a unique identification number in NDE on submission. A separate monthly tally of alterations approved at each point will be plotted to provide a trend on the "productivity" of the process.

b. Basis for Baseline. Since this metric is based solely on the entitled process, the baseline will be established after 12 months of data collection.

c. Required NDE Fields:

(1) SCD identification number.

(2) Approval status of SCD at each of the decision points Status will be blank for a specific decision point if SCD has not yet reached that block in the process.

(3) Date that decision at each point was reached. Date will be blank for a specific decision point if the SCDs approval status at that point is blank.

36.9.1.5 Sunk Cost. For all SCDs that are entered into NDE under the entitled process, identify and measure the total resources (dollars) invested in SCDs that are subsequently voted to be "Inactive and Killed" at various process decision points. Metric data will be collected and analyzed monthly, and tallied by type of appropriation on an annual basis.

CALCULATION: For all SCDs that are entered into NDE

a. Total of actual dollars expended in all FY for an SCD "killed" at Decision Point 1 (Authorize Preliminary Engineering).

(1) Capture actual expenditures as recorded in NDE as part of the CBA prepared for Decision Point 1.

(2) Metric may be further refined for phase of development and type appropriation per the cost categories recorded in the CBA as follows:

(a) Infrastructure investment – Appropriation/Preliminary Engineering (APPN/PE)

(b) Preliminary Engineering – APPN/PE

b. Total of actual dollars expended in all FY for an SCD "killed" at Decision Point 2 (Authorize Design Development).

(1) Capture actual expenditures as recorded in NDE as part of the CBA prepared for Decision Point 2.

(2) Metric may be further refined for phase of development and type appropriation per the cost categories recorded in the CBA as follows:

(a) Infrastructure investment – APPN/PE

(b) Preliminary Engineering – APPN/PE

c. Total of actual dollars expended in all FY for an SCD "killed" at Decision Point 3 (Authorize Procurement and Installation).

(1) Capture actual expenditures as recorded in NDE as part of the CBA prepared for Decision Point 3.

(2) Metric may be further refined for phase of development and type appropriation per the cost categories recorded in the CBA as follows:

(a) Infrastructure investment – APPN/PE

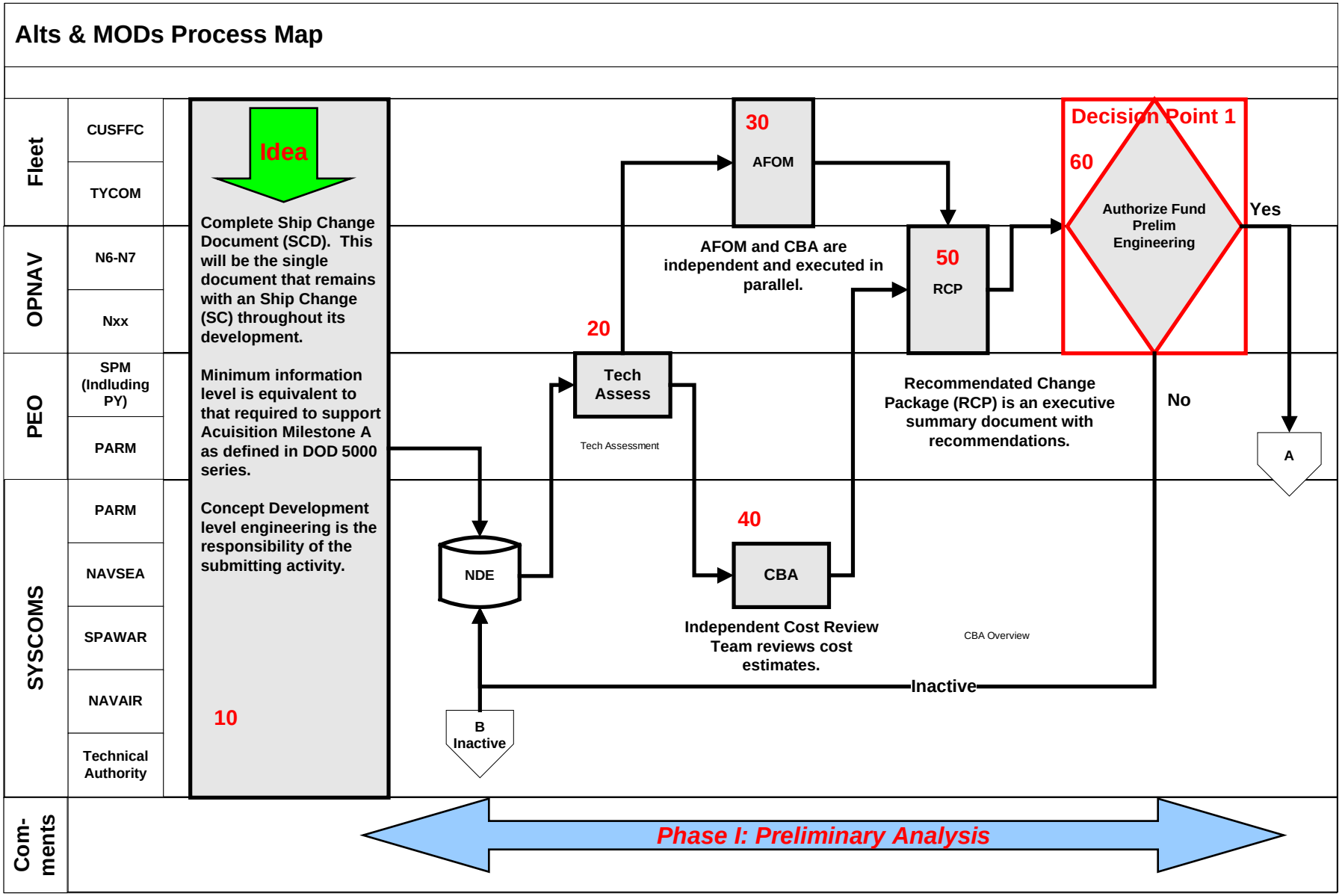
(b) Preliminary Engineering – APPN/PE

(c) Design Development – APPN/PE

36.10 MILESTONES. Surface Force Ship Planning Process Milestones are documented in Volume II, Part II, Chapter 2, Appendix D of this manual. Aircraft Carrier Navy Modernization Process Milestones are documented in Volume II, Part II, Chapter 2, Appendix E of this manual.

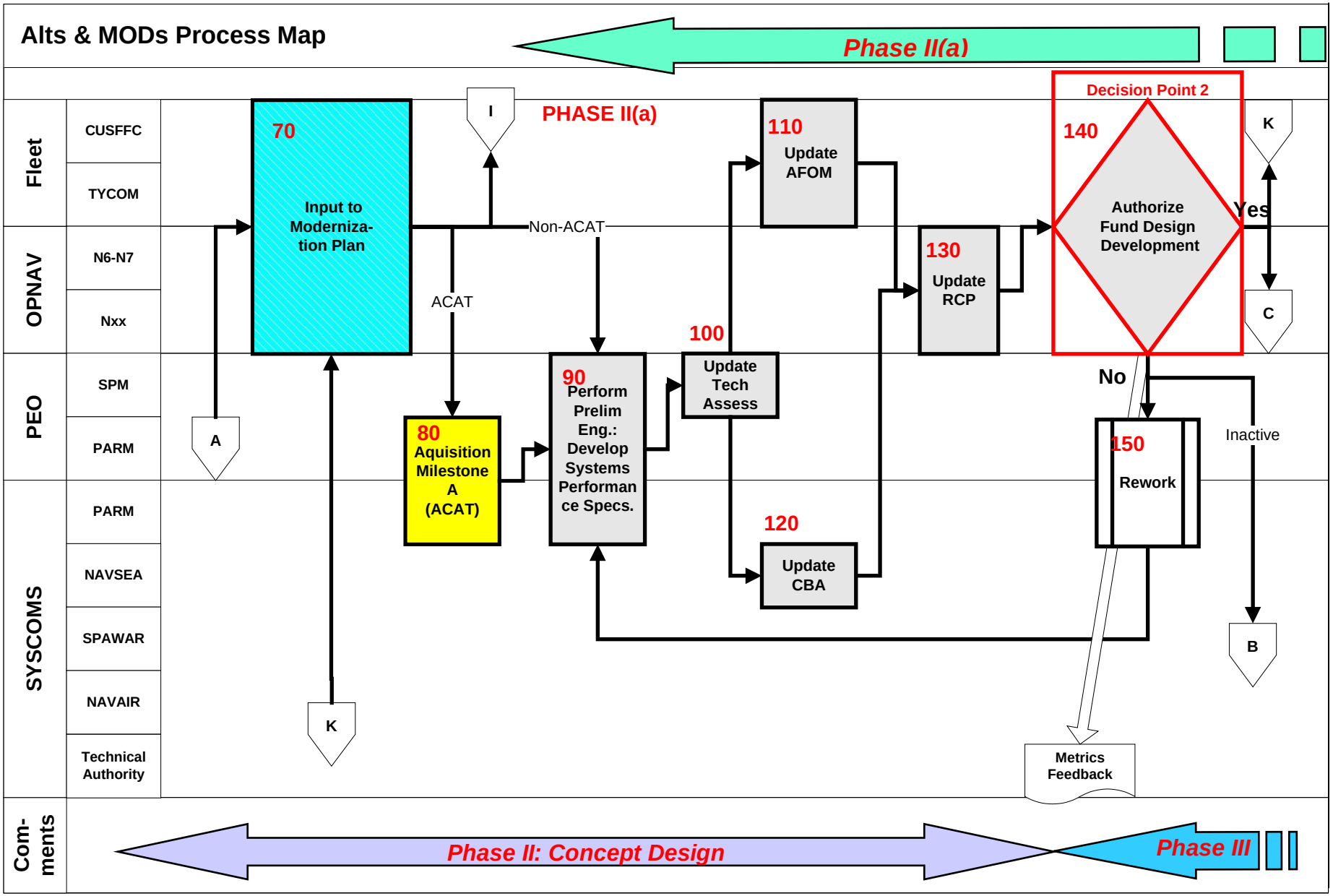
APPENDIX A

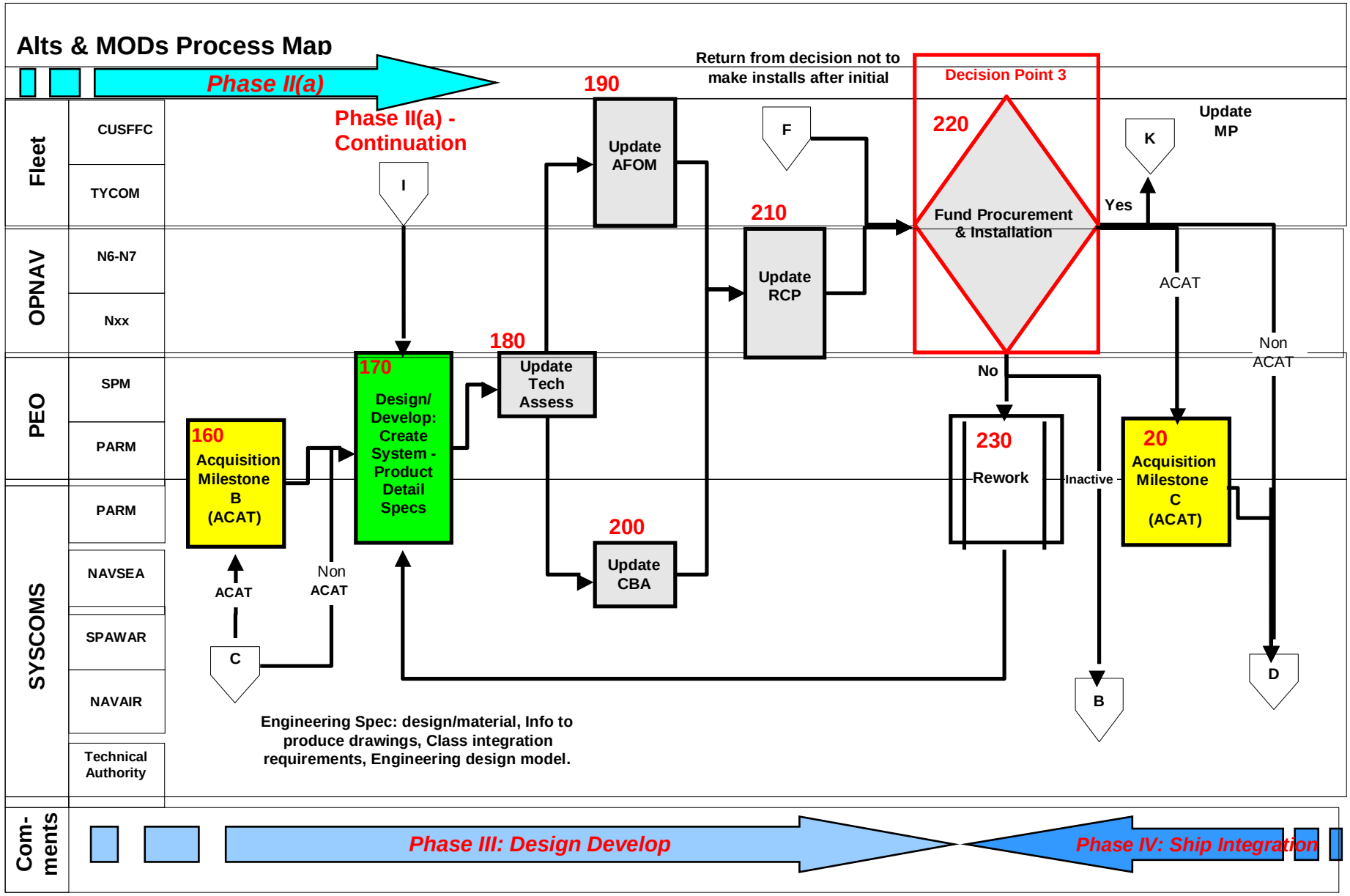
MODERNIZATION PLAN FLOWCHART



APPENDIX A

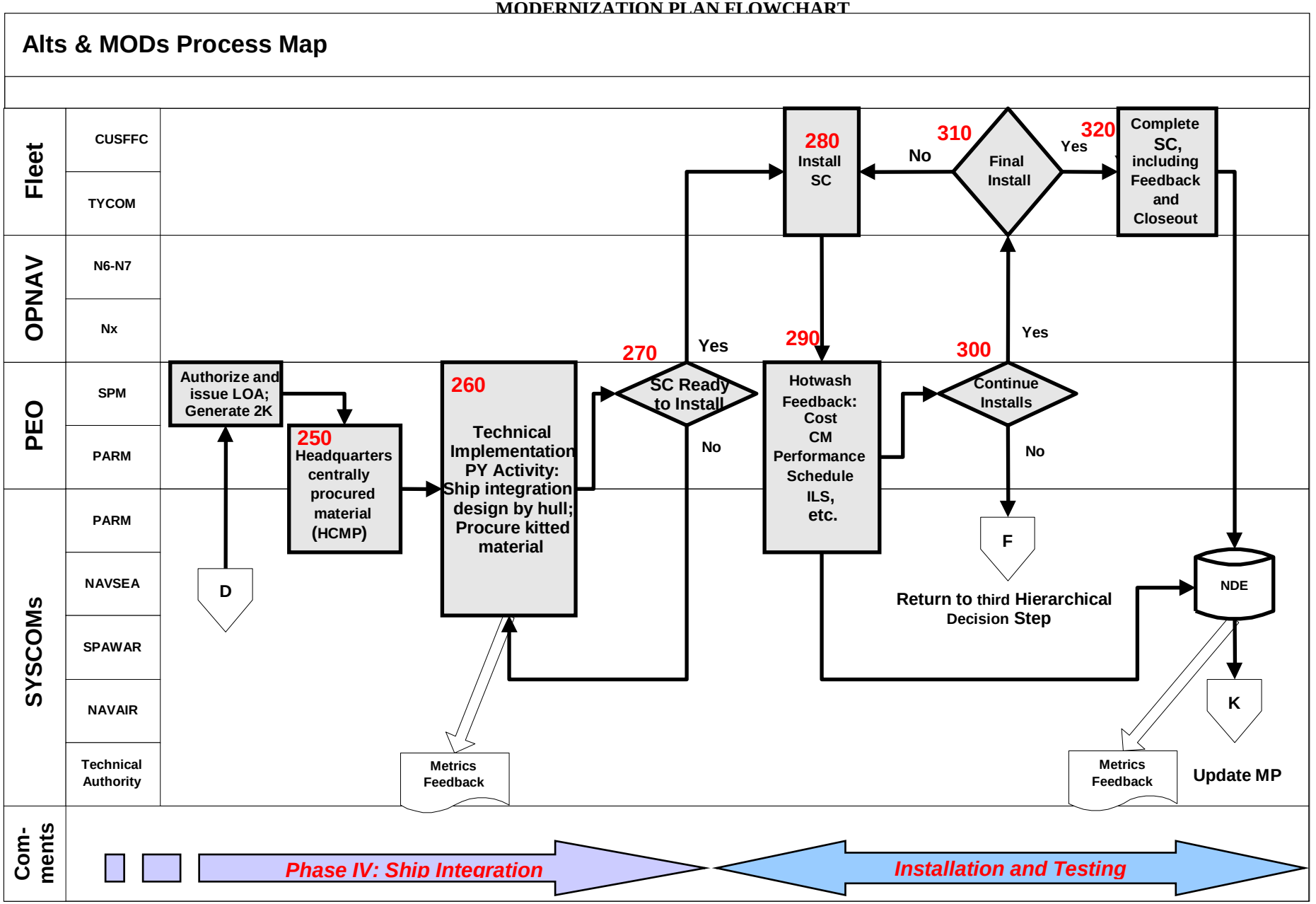
MODERNIZATION PLAN FLOWCHART




Alts & MODs Process Map
Phase II(a)
Phase II(a) - Continuation
Return from decision not to make installs after initial
190
Update AFOM
F
210
Update RCP
220
Decision Point 3
Fund Procurement & Installation
K
Update MP
Yes
ACAT
Non ACAT
No
180
Update Tech Assess
170
Design/ Develop: Create System - Product Detail Specs
I
160
Acquisition Milestone B (ACAT)
ACAT
Non ACAT
C
200
Update CBA
230
Rework
Inactive
20
Acquisition Milestone C (ACAT)
B
D
Engineering Spec: design/material, Info to produce drawings, Class integration requirements, Engineering design model.
Fleet
CUSFFC
TYCOM
OPNAV
N6-N7
Nxx
PEO
SPM
PARM
SYSCOMS
PARM
NAVSEA
SPAWAR
NAVAIR
Technical Authority
Com-ments
Phase III: Design Develop
Phase IV: Ship Integration

APPENDIX A

MODERNIZATION PLAN FLOWCHART



APPENDIX B

SHIP CHANGE DOCUMENT TEMPLATE
PHASE I

CHANGE TRACKING NUMBER_____ **Recommend Expedite** ☐

DATE: _____ **CLASSIFIED/NOFORN:** YES____ NO____

1. SHIP CHANGE TITLE: **_____**

2. APPLICABLE SHIP/SHIP CLASS/SITES (INCLUDES SHORE FACILITIES): _____

3. RECOMMENDED SCD:

a. Scope: (Check all that apply)
- ❑ Internal Equipment Modification
- ❑ Ship Modification
- ❑ Site Modification

b. Category (Check all that apply)
- ❑ HM&E
- ❑ C4I
- ❑ CS
- ❑ Computer Program/Software

c. Duration
- ❑ Permanent
- ❑ Temporary

d. Funding
- ❑ Program
  - o Joint
- ❑ Fleet
  - o Joint

4. INITIATING POINT OF CONTACT: NAME___ ACTIVITY _____CODE___ PHONE___ EMAIL___ DATE_____N/A_____

5. SUBMITTING POINT OF CONTACT: NAME___ ACTIVITY/CODE ___ PHONE___ EMAIL___DATE_____

6. PARM POINT OF CONTACT: NAME___ ACTIVITY/CODE ___ PHONE___ EMAIL___TBD_____

7. TYCOM POINT OF CONTACT: NAME___ ACTIVITY/CODE ___ PHONE___ EMAIL___

8. TECHNICAL POINT OF CONTACT: NAME___ ACTIVITY/CODE ___ PHONE___ EMAIL___

9. DESCRIPTION OF CHANGE: _____

10. IMPACT IF NOT ACCOMPLISHED: _____

11. REQUIREMENTS AND JUSTIFICATION OF CHANGE (CITE DOCUMENT/REQUIREMENT IN NARRATIVE BOX)

- ❑ Statutory Requirement
- ❑ Legislated Regulatory Requirement
- ❑ Environmental Requirement
- ❑ Proposed Military Improvement
- ❑ Proposed Survivability Improvement
- ❑ Reduction of Total Owner Ship Costs (R-TOC)
- ❑ Strike Force Interoperability (BFI)

- ❑ Safety
- ❑ Mandatory Safety
- ❑ QOL/QOS
- ❑ Restoring Margins
- ❑ Contract Defect
- ❑ Unavailable, Obsolete or Unreliable Equipment
- ❑ Testing and Trial Deficiency
- ❑ Top Management Attention/Top Management Initiative (TMA/TMI)
- ❑ Aviation Capability and Air Wing Compatibility
- ❑ Anti-Terrorism/Force Protection
- ❑ Other

Need/Purpose Narrative:

12. DISTRIBUTIVE SYSTEMS/OTHER IMPACTS (Check at least one box)

	Yes	No
AC Plants/Chilled Water		
Electric Generation and Power Distribution Systems		
Topside Design/Mast Structure		
Fiber Optic Cable Plant		
Firemain		
Weight & Moment Change		
IC Switchboard & Database Multiplex System		
Electrical (400 Hz)		
Potable Water		
Fuel System		
Air Systems		
Networks		
IC Circuits		
HVAC		
Ships Characteristics Document change required		
Ship/Aviation Integration		
Storage Requirements		
Dry Docking Required		
Certification Required		
SUBSAFE		
Space Configuration		
Damage Control		
Software		
Weapons Systems		
Human Systems Integration (HSI)		
Hangar Bay/Flight Deck Encroachment		
Integrated Logistics Support (ILS)		
Prior/Concurrent/Conjunctive Alts		
Ordnance Handling/Storage		
Other (Systems/Equipment/Sites):		

13. AFOM

SEA SHIELD

Force Protection
- ❑ Protect against SOF & Terrorist Threats
- ❑ Mitigate effects of CBRNE

Surface Warfare
- ❑ Provide Self Defense against Surface Threats
- ❑ Conduct Offensive Operations against Surface Threats

Under Sea Warfare
- ❑ Provide Self Defense against Subsurface Threats
- ❑ Neutralize Submarine threats in the Littorals
- ❑ Neutralize open oceans Submarine Treats
- ❑ Counter Minefields from deep to shallow water
- ❑ Breach Minefields, Obstacles, and Barriers from very shallow water to the beach exit zone
- ❑ Conduct Mining Operations

Theater Air and Missile Defense
- ❑ Provide Self Defense against Air and Missile Threats
- ❑ Provide Maritime Air and Missile Defense
- ❑ Provide Overland Air and Missile Defense
- ❑ Conduct Sea-Based Missile Defense

SEA STRIKE

Strike
- ❑ Conduct Strike OPS
  - o Engage Fixed Land Targets
  - o Engage Moving Land Targets
- ❑ Conduct Special OPS
  - o Provide Precision Targeting
  - o Conduct Direct Action
- ❑ Conduct Offensive Information Operations
  - o Jam Potential Threats
  - o Conduct Network Attacks
- ❑ Provide Aircraft Survivability

Naval Fire Support
- ❑ Provide Precision Fires
- ❑ Provide High Volume Fires
- ❑ Provide Extended Range Fires

Maneuver
- ❑ Project/Reposition Forces
- ❑ Assault Centers of Gravity and Critical Vulnerabilities
- ❑ Conduct Concurrent/Follow-on Missions

Strategic Deterrence
- ❑ Conduct Nuclear Strike
- ❑ Provide Assured Survivability

SEA BASING

Close, Assemble, Employ & Reconstitute
- ❑ Close the Force & Maintain Mobility
- ❑ Provide at Sea Arrival & Assembly
- ❑ Allow Selective Offload

- Reconstitute & Regenerate at Sea

Provide Integrated Joint Logistics
- Provide Sustainment for Operations at Sea
- Provide Sustainment for Operations Ashore
- Provide Focused Logistics
- Provide Shipboard and Mobile Maintenance
- Provide Force Medical Services
- Provide Advance Base Support

Preposition Joint Assets Afloat
- Integrate and Support Joint Personnel and Equipment
- Provide Afloat C2 Physical Infrastructure
- Provide AFSB Capability for Joint Operations

FORCENET

Communications and Data Networks
- Provide Communication Infrastructure
- Provide Network Protection
- Provide Network Synchronization
- Provide Information Transfer

Intel, Surveillance and Recon
- Conduct Sensor management and Information Processing
- Detect and ID Targets
  - Fixed Land Targets
  - Moving Land Targets
  - Air and Missile Targets
  - Surface Targets
  - Submarine Targets
  - Mines
- Provide Cueing and Targeting Information
- Assess Engagement Results

Common Operational and Tactical Pictures
- Provide Mission Planning
- Provide Battle Management Synchronization
- Provide Common PNT and Environmental Info
- Integrate and Distribute Sensor Info
- Track and Facilitate Engagement of Time Sensitive Targets
- Track and Facilitate Engagement of Non-Time Sensitive Targets

Phase I -- CBA input on SCD

Investment Costs	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
System/Equipment Design/Development Cost													
Concept Development													
Preliminary Engineering													
Design Development													
Subtotal System/Equipment Design/Development Cost													
System/Equipment Procurement Cost													
Subtotal System/Equipment Procurement Cost													
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	To Complete (Constant Year $)
Installation/Checkout Cost													
Subtotal Installation/Checkout Cost													
Subtotal (Sum of Major Cost Element Categories By FY)													

"To Complete" Dollars would be entered as a total of Then Year $. Sponsor of SCD would convert Then Year $ for "To Complete" based on anticipated phasing to a "To Complete (Constant Year $) entry.

Appropriation/Program Element Funding Plan	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Phase I -Preliminary Engineering													
Appn/PE (Include all as required)													
Phase II - Design Development													
Appn/PE (Include all as required)													
Phase III - Procurement													
Appn/PE (Include all as required)													
Phase III - Installation													
Appn/PE (Include all as required)													
Subtotal (By FY)													

Blue Shaded Cost elements will be entered by the submitting PARM.

Totals must equal

Projected Savings and Cost Avoidance	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Development Phase													
- Direct													
- Additional TOC Elements													
Total Development Phase	0	0	0	0	0	0	0	0	0	0	0	0	0
Production Phase													
- Recurring													
- Non-recurring													
- Additional TOC Elements													
Total Production Phase													
Operating & Support													
- O-Level / Mission Personnel													
- Unit Level Consumption													
- Intermediate Maintenance													
- Depot Maintenance													
- Contractor Support													
- Sustaining Support													
- Indirect Support													
- Other													
Total Operating and Support													
Labor rates used to calculate O&S savings/cost avoidance					O Level ($K/man-year) =					I Level ($K/man-year) =			
MILPERS Workload Reduction (Man-years)	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Organization Level Personnel												0.0	
Intermediate Maintenance												0.0	

Installation Fielding Plan Data	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total
Total Production Units	0	0	0	0	0	0	0	0	0	0	0	0 0
Ship Class Total Installations (Ship Quantity)												
Hull XX												
Hull YY												
Hull ZZ												
Hull YY												

Data should be entered at the lowest level possible. If hull specific information is not known, enter either Baseline/Flt quantities or ship class quantities.

14. CONCEPT DEVELOPMENT COST INFORMATION:

15. APPROVAL RECOMMENDATION:

Recommended Not Recommended Recommend Re-Work

NUCLEAR POWER DIRECTORATE (As Required)

Signature_____ **DATE** _____ _____ _____

SHIP PROGRAM MANAGER

Signature_____ **DATE** _____ _____ _____

CHANGE TRACKING NUMBER_____ **Recommend Expedite** ☐

SHIP CHANGE TITLE: _____

TECHNICAL REVIEW COMMENTS:

PHASE II

CHANGE TRACKING NUMBER_____ **Expedite Approved** ☐

SHIP CHANGE TITLE: **_____**

DESCRIPTION OF CHANGE: _____

IMPACT IF NOT ACCOMPLISHED: _____

APPLICABLE SHIP/SHIP CLASS/SITES: _____

DATE: _____

1. LIST APPLICABLE SHIP(s) WITHIN 5-YEAR DECOMMISSIONING WINDOW: _____

2. DISTRIBUTIVE SYSTEMS IMPACT: (check box that applies)

	Net Increase	Net Decrease	No Net Impact	Unknown
AC Plants/Chilled Water				
Electric Generation and Power Distribution Systems				
Topside Design/Mast Structure				
Fiber Optic Cable Plant				
Firemain				
Weight & Moment Change				
IC Switchboard & Database Multiplex System				

3. OTHER CONSIDERATIONS (IF YES, PROVIDE EXPLANATION):

(i) Topside: **Yes No**

Explanation:

a. Ship Characteristics Document change required: **Yes No**

Explanation:

b. Ship/Aviation Integration Impact: **Yes No**

Explanation:

i. Storage Requirements: **Yes No**

Explanation:

ii. Dry Docking Required: **Yes No**

Explanation:

iii. Certification Required: **Yes No**

Explanation (include responsible activity):

(1) SUBSAFE Impact: **Yes No N/A**

(i) Network Impact: **Yes No**

Explanation:

(ii) Fuel System Impact: **Yes No**

Explanation:

(iii) IC Circuits Impact: **Yes No**

Explanation:

(iv) MCS/DCS Impact: **Yes No**

Explanation:

(v) Software Impact: **Yes No**

Explanation:

(vi) Weapons Systems Impact: **Yes No**

Explanation:

Space Configuration: Yes No

Explanation:

(vii) Hangar Bay/Flight Deck Impact: **Yes No**

Explanation:

Air Systems: Yes No

Explanation:

Ordnance Handling/Storage: Yes No

Explanation:

iv. Other: ____

Explanation:

4. SHOCK, VIBRATION AND EMI REQUIREMENTS:

Shock Grade (check one in accordance with the GSO section 072):

A B C N/A

Compliant with MIL-STD-167-1 Type 1 Vibration Requirements (check one):

Yes No N/A

Compliant with MIL-STD-461 EMI Requirements (check one):

Yes No N/A

Compliant with MIL-STD-464 EMI Requirements (check one):

Yes No Tailored (specifics appended) N/A

Compliant with OPNAVINST-2400.20 RF Spectrum Management Requirements

Yes No N/A

Compliant with HERO/HERP/HERF (NAVSEA OP 3565) Requirements (check one):

Yes No N/A

1. Remarks: _____

5. INTEGRATED LOGISTICS SUPPORT (ILS) IMPACT (check all that apply)

- ❑ Technical Manuals
- ❑ Provisioning
- ❑ Planned Maintenance System (PMS)
- ❑ Ship's Selected Records (Drawings & Manuals)
- ❑ Operating Sequencing Systems (OSS)
- ❑ Steam Plant Manual (SPM)

- ❑ Test Equipment
- ❑ Software management
  Specify software support activity: _____
- ❑ Spares Affected
  Specify responsible activity: _____
- ❑ COTS/NDI
- ❑ Facilities
- ❑ Other (Specify): _____

6. HUMAN SYSTEMS INTEGRATION (HSI) IMPACTS:

Manpower /Workload Impact: Yes / No
Brief Description:
Personnel Impact: Yes / No
Brief Description:
Training Impact: Yes / No
Brief Description:
Human Factors Engineering (HFE): Yes / No
Brief Description:
Habitability: Yes / No
Brief Description:
Environment, Safety and Occupational Health (ESOH): Yes / No
Brief Description:
Personnel Survivability: Yes / No
Brief Description:

7. CRITICAL MATERIAL: _____

8. PRIOR, CONJUNCTIVE OR CONCURRENT CHANGE ACCOMPLISHMENT (LIST ANY CHANGE THAT APPLIES): _____

9. ESWBS _____

10. DETAIL DESIGN CRITERIA: (Check all that apply)

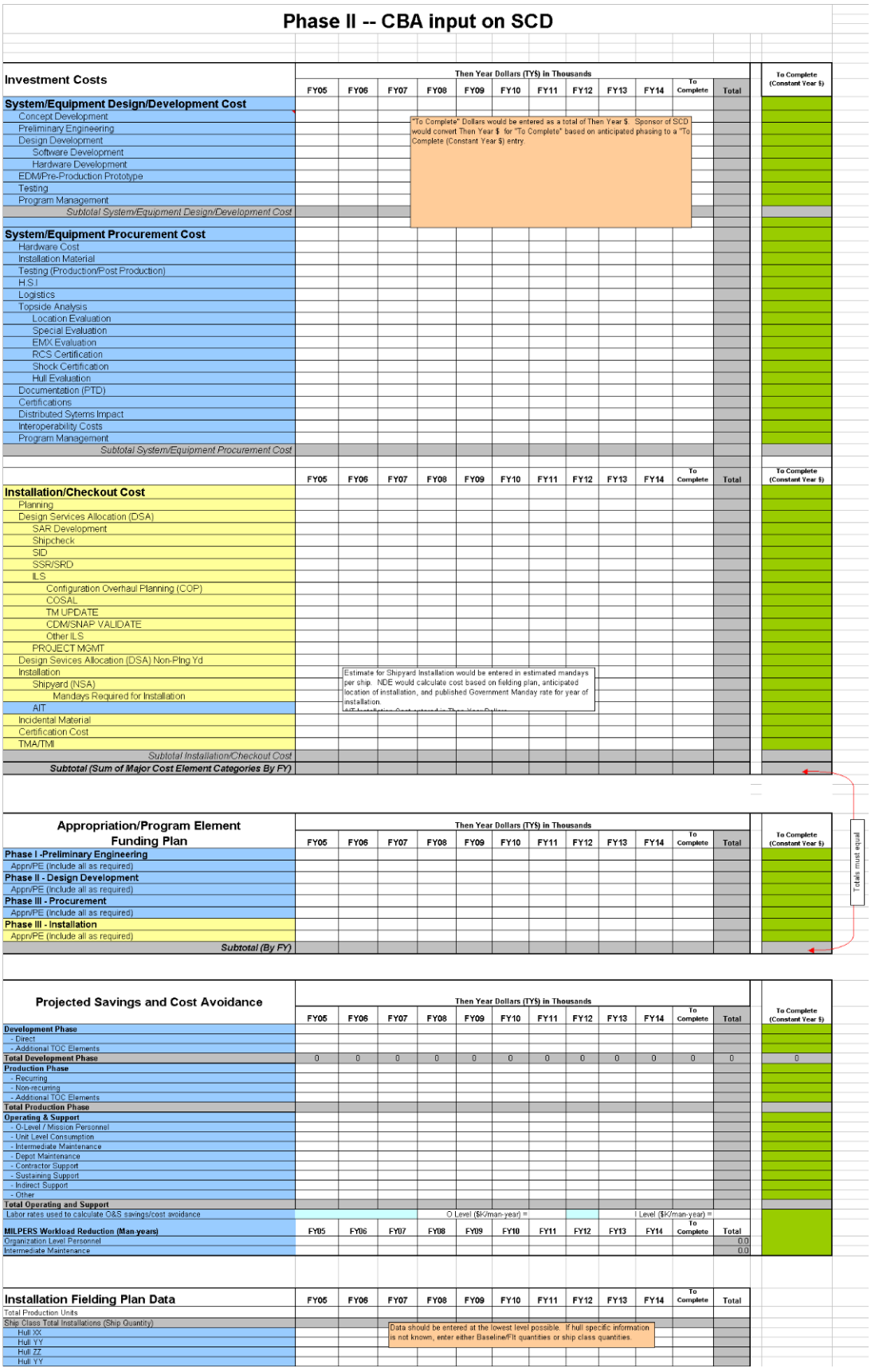
- ❑ Ship Specification
- ❑ Deep Diving General Overhaul Specification
- ❑ General Specifications for Overhaul (GSO)
- ❑ Other (Specify)_____

11. PROTOTYPE REQUIRED:

Yes_____ No_____
Approx Time Required Onboard _____

12. AFOM

13. CBA INFORMATION



Phase II -- CBA input on SCD

Investment Costs	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
System/Equipment Design/Development Cost													
Concept Development													
Preliminary Engineering													
Design Development													
Software Development													
Hardware Development													
EDM/Pre-Production Prototype													
Testing													
Program Management													
Subtotal System/Equipment Design/Development Cost													
System/Equipment Procurement Cost													
Hardware Cost													
Installation Material													
Testing (Production/Post Production)													
H.S.I													
Logistics													
Topside Analysis													
Location Evaluation													
Special Evaluation													
EMX Evaluation													
RCS Certification													
Shock Certification													
Hull Evaluation													
Documentation (PTD)													
Certifications													
Distributed Sytems Impact													
Interoperability Costs													
Program Management													
Subtotal System/Equipment Procurement Cost													
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	To Complete (Constant Year $)
Installation/Checkout Cost													
Planning													
Design Services Allocation (DSA)													
SAR Development													
Shipcheck													
SID													
SSR/SRD													
ILS													
Configuration Overhaul Planning (COP)													
COSAL													
TM UPDATE													
CDM/SNAP VALIDATE													
Other ILS													
PROJECT MGMT													
Design Sevices Allocation (DSA) Non-Plng Yd													
Installation													
Shipyard (NSA)													
Mandays Required for Installation													
AIT													
Incidental Material													
Certification Cost													
TMA/TMI													
Subtotal Installation/Checkout Cost													
Subtotal (Sum of Major Cost Element Categories By FY)													

"To Complete" Dollars would be entered as a total of Then Year $. Sponsor of SCD would convert Then Year $ for "To Complete" based on anticipated phasing to a "To Complete (Constant Year $) entry.

Estimate for Shipyard Installation would be entered in estimated mandays per ship. NDE would calculate cost based on fielding plan, anticipated location of installation, and published Government Manday rate for year of installation.

Appropriation/Program Element Funding Plan	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Phase I -Preliminary Engineering													
Appn/PE (include all as required)													
Phase II - Design Development													
Appn/PE (include all as required)													
Phase III - Procurement													
Appn/PE (include all as required)													
Phase III - Installation													
Appn/PE (include all as required)													
Subtotal (By FY)													

Totals must equal

Projected Savings and Cost Avoidance	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Development Phase													
- Direct													
- Additional TOC Elements													
Total Development Phase	0	0	0	0	0	0	0	0	0	0	0	0	0
Production Phase													
- Recurring													
- Non-recurring													
- Additional TOC Elements													
Total Production Phase													
Operating & Support													
- O-Level / Mission Personnel													
- Unit Level Consumption													
- Intermediate Maintenance													
- Depot Maintenance													
- Contractor Support													
- Sustaining Support													
- Indirect Support													
- Other													
Total Operating and Support													
Labor rates used to calculate O&S savings/cost avoidance				O Level ($K/man-year) =						Level ($K/man-year) =			
MILPERS Workload Reduction (Man-years)	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Organization Level Personnel												0.0	
Intermediate Maintenance												0.0	

Installation Fielding Plan Data	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total
Total Production Units												
Ship Class Total Installations (Ship Quantity)												
Hull XX												
Hull YY												
Hull ZZ												
Hull YY												

Data should be entered at the lowest level possible. If hull specific information is not known, enter either Baseline/Flt quantities or ship class quantities.

14. APPROVAL RECOMMENDATION:

		Recommended	Not Recommended	Recommend Re-Work
NUCLEAR POWER DIRECTORATE (As Required)				
Signature_____	DATE	_____	_____	_____
SHIP PROGRAM MANAGER				
Signature_____	DATE	_____	_____	_____

TECHNICAL REVIEW COMMENTS:

PHASE III

CHANGE TRACKING NUMBER_____ **Recommend Expedite** ☐

SHIP CHANGE TITLE: **_____**

DESCRIPTION OF CHANGE: _____

IMPACT IF NOT ACCOMPLISHED: _____

APPLICABLE SHIP/SHIP CLASS/SITES: _____

DATE: _____

1. SYSTEM/EQUIPMENT DESIGNATION: _____

2. MODEL NO.____

3. CAGE CODE____

4. DETAILED DESCRIPTION OF CHANGE:_____

5. DISTRIBUTIVE SYSTEMS IMPACT:

	Added	**Removed**
A/C Plants / Chilled Water Dist (Tons A/C)		
(CHW GPM)		
Electrical Generation and Power Dist Sys (kW)		
Topside Design / Mast Structure (Weight in Tons)		
Fiber Optic Cable Plant (Yes / No)		
Firemain (GPM)		
Ship's Stability (Weight in Tons)		
IC SWBD and Database Multiplex Sys (Loads)		

6. ARE THERE REFERENCES/SUPPORTING DOCUMENTATION IN ADDITION TO STANDARD REQUIREMENTS? Yes____ No_____

7. ESTIMATED WEIGHT AND MOMENT:

WEIGHT	VCG	LCG	TCG
Stability Statement			

8. CHANGE MATERIAL/SOFTWARE LIST:

ITEM NO.	DESCRIPTION	UNIT OF ISSUE	QUANTITY	PROCURING ACTIVITY

9. ARE THERE QUALITY ASSURANCE REQUIREMENTS IN ADDITION TO STANDARD REQUIREMENTS? Yes____ No_____

If Yes, List Requirements:_____

10. SPECIAL DISPOSITION REQUIREMENTS FOR REMOVED MATERIAL:

MATERIAL	DISPOSITION

11. INSTALLATION SUPPORT AND TEST EQUIPMENT:_____

12. SHIPBOARD STOWAGE DETAILS:_____

13. NAVSEA SHIP INSTALLATION DRAWING (SID) REVIEW REQUIRED: YES___ NO___

14. SPECIAL INDUSTRIAL STOWAGE REQUIREMENTS:_____

15. REQUIRED PRIOR, CONJUNCTIVE OR CONCURRENT CHANGES:_____

16. OTHER SYSTEMS IMPACTS:_____

17. INSTALLATION DURATION:_____

18. HUMAN SYSTEMS INTEGRATION (HSI):

Manpower/Workload:_____
Personnel:_____
Training:_____
Human Factors Engineering (HFE):_____
Habitability:_____
Environment, Safety and Occupational Health (ESOH):_____
Personnel Survivability:_____

19. CERTIFICATIONS/QUALIFICATIONS REQUIRED (CHECK ALL THAT APPLY):

ILS Cert _____ Estimated Completion Date _____
HSI Cert _____ Estimated Completion Date _____
EMI Cert_____ Estimated Completion Date _____
WSESRB_____Estimated Completion Date _____
Software Cert_____ Estimated Completion Date _____
Shock Qualification____ Estimated Completion Date _____
SPAWAR PPL/SSIL (IT-21) Cert_____Estimated Completion Date_____
SEA 62 Interoperability Cert_____Estimated Completion Date_____
Other Cert (Specify)_____ Estimated Completion Date _____
Other Cert (Specify)_____ Estimated Completion Date _____

20. DETAILED COST STRUCTURE:

Phase III -- CBA input on SCD

Investment Costs	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
System/Equipment Design/Development Cost													
Concept Development													
Preliminary Engineering													
Design Development													
Software Development													
Hardware Development													
EDM/Pre-Production Prototype													
Testing													
Program Management													
Subtotal System/Equipment Design/Development Cost													
System/Equipment Procurement Cost													
Activation Cost													
Hardware Cost													
Production Engineering													
Installation Material													
INCO													
RINCO													
SPARES													
Testing (Production/Post Production)													
Developmental Testing													
Operational Testing													
H.S.I													
Training/Training Support													
Schoolhouse modification													
Installation Training													
NTSP Development/Update													
Training Development Costs													
Manpower and Personnel													
Top Down Requirements Analysis (TDRA)													
Other Manpower Workload Analysis													
Logistics													
Special Tools/Test Equipment/MAMS													
Facilities													
Manpower & Personnel													
PHS&T(Special Handling)													
Support Equipment													
Topside Analysis													
Topside Design													
Location Evaluation													
Special Evaluation													
EMX Evaluation													
RCS Certification													
Shock Certification													
Hull Evaluation													
Documentation (PTD)													
Certifications													
Distributed Systems Impact													
Battle Force Interoperability Studies													
Stability Analysis and Studies													
Program Management													
Stability Analysis and Studies													
Subtotal System/Equipment Procurement Cost													

"To Complete" Dollars would be entered as a total of Then Year $. Sponsor of SCD would convert Then Year $ for "To Complete" based on anticipated phasing to a "To Complete (Constant Year $) entry.

Blue Shaded Cost elements will be entered by the submitting PARM.

Yellow Shaded Cost elements will be entered by the appropriate SPM.

	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	To Complete (Constant Year $)
Installation/Checkout Cost													
Planning													
Certification Cost													
ILS Certification													
H.S.I Certification													
Shipcheck													
SID													
SSR/SRD													
ILS													
Configuration Overhaul Planning (COP)													
COSAL													
TM UPDATE													
CDM/SNAP VALIDATE													
Other ILS													
PROJECT MGMT													
Design Services Allocation (DSA)													
Mandays Required for Installation													
Shipyard (NSA)													
AIT													
OSR (On Site Representatives)													
Special Services													
Total Ship Testing													
H.S.I Certification													
TMA/TMI													
Subtotal Installation/Checkout Cost													
Subtotal (Sum of Major Cost Element Categories By FY)													

Estimate for Shipyard Installation would be entered in estimated mandays per ship. NDE would calculate cost based on fielding plan, anticipated location of installation, and published Government Manday rate for year of installation.
AIT Installation Cost entered in Then Year Dollars.

Appropriation/Program Element Funding Plan	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Phase I -Preliminary Engineering													
Appn/PE (Include all as required)													
Phase II - Design Development													
Appn/PE (Include all as required)													
Phase III - Procurement													
Appn/PE (Include all as required)													
Phase III - Installation													
Appn/PE (Include all as required)													
Subtotal (By FY)													

Totals must equal

Projected Savings and Cost Avoidance	Then Year Dollars (TY$) in Thousands												To Complete (Constant Year $)
	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Development Phase													
- Direct													
- Additional TOC Elements													
Total Development Phase	0	0	0	0	0	0	0	0	0	0	0	0	0
Production Phase													
- Recurring													
- Non-recurring													
- Additional TOC Elements													
Total Production Phase													
Operating & Support													
- O-Level / Mission Personnel													
- Unit Level Consumption													
- Intermediate Maintenance													
- Depot Maintenance													
- Contractor Support													
- Sustaining Support													
- Indirect Support													
- Other													
Total Operating and Support													
Labor rates used to calculate O&S savings/cost avoidance				O Level ($K/man-year) =					I Level ($K/man-year) =				
MILPERS Workload Reduction (Man-years)	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total	
Organization Level Personnel												0.0	
Intermediate Maintenance												0.0	

Installation Fielding Plan Data	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	To Complete	Total
Total Production Units												
Ship Class Total Installations (Ship Quantity)												
Hull XX												
Hull YY												
Hull ZZ												
Hull YY												

Data should be entered at the lowest level possible. If hull specific information is not known, enter either Baseline/Flt quantities or ship class quantities.

21. APPROVAL RECOMMENDATION:

		Recommended	Not Recommended	Recommend Re-Work
NUCLEAR POWER DIRECTORATE (As Required)				
Signature_____	**DATE**	_____	_____	_____
SHIP PROGRAM MANAGER				
Signature_____	**DATE**	_____	_____	_____

TECHNICAL EVALUATION COMMENTS:

CHANGE TRACKING NUMBER_____ **Recommend Expedite** ☐
SHIP CHANGE TITLE: **_____**
DESCRIPTION OF CHANGE: _____
IMPACT IF NOT ACCOMPLISHED: _____
APPLICABLE SHIP/SHIP CLASS/SITES: _____
DATE: _____

1. LIST APPLICABLE SHIP(s) WITHIN 5-YEAR DECOMMISIONING WINDOW: _____

2. SYSTEM/EQUIPMENT DESIGNATION: _____

3. MODEL NO.____

4. CAGE CODE____

5. DETAILED DESCRIPTION OF CHANGE:_____

6. ESWBS _____

7. PROTOTYPE REQUIRED:

Yes_____ No_____
Approx Time Required Onboard_____

8. DISTRIBUTIVE SYSTEMS IMPACT: (check box that applies)

	Added	**Removed**
A/C Plants / Chilled Water Dist (Tons A/C)		
(CHW GPM)		
Electrical Generation and Power Dist Sys (kW)		
Topside Design / Mast Structure (Weight in Tons)		
Fiber Optic Cable Plant (Yes / No)		
Firemain (GPM)		
Ship's Stability (Weight in Tons)		
IC SWBD and Database Multiplex Sys (Loads)		

9. OTHER CONSIDERATIONS (IF YES, PROVIDE EXPLANATION):

(i) Topside: **Yes No**

Explanation:

a. Ship Characteristics Document change required: **Yes No**

Explanation:

b. Ship/Aviation Integration Impact: **Yes No**

Explanation:

i. Storage Requirements: **Yes No**

Explanation:

ii. Dry Docking Required: **Yes No**

Explanation:

iii. Certification Required: **Yes No**

Explanation (include responsible activity):

(1) SUBSAFE Impact: **Yes No N/A**

(i) Network Impact: **Yes No**

Explanation:

(ii) Fuel System Impact: **Yes No**

Explanation:

(iii) IC Circuits Impact: **Yes No**

Explanation:

(iv) MCS/DCS Impact: **Yes No**

Explanation:

(v) Software Impact: **Yes No**

Explanation:

(vi) Weapons Systems Impact: **Yes No**

Explanation:

Space Configuration: **Yes No**

Explanation:

(vii) Hangar Bay/Flight Deck Impact: **Yes No**

Explanation:

Air Systems: **Yes No**

Explanation:

Ordnance Handling/Storage: **Yes No**

Explanation:

iv. Other: ____

Explanation:

10. SHOCK, VIBRATION AND EMI REQUIREMENTS:

Shock Grade (check one in accordance with the GSO section 072):

A B C N/A

Compliant with MIL-STD-167-1 Type 1 Vibration Requirements (check one):

Yes No N/A

Compliant with MIL-STD-461 EMI Requirements (check one):

Yes No N/A

Compliant with MIL-STD-464 EMI Requirements (check one):

Yes No Tailored (specifics appended) N/A

Compliant with OPNAVINST-2400.20 RF Spectrum Management Requirements

Yes No N/A

Compliant with HERO/HERP/HERF (NAVSEA OP 3565) Requirements (check one):

Yes No N/A

1. **Remarks:** _____

11. INTEGRATED LOGISTICS SUPPORT (ILS) IMPACT (check all that apply)

- ❑ Technical Manuals
- ❑ Provisioning
- ❑ Planned Maintenance System (PMS)
- ❑ Ship's Selected Records (Drawings & Manuals)
- ❑ Operating Sequencing Systems (OSS)
- ❑ Steam Plant Manual (SPM)
- ❑ Test Equipment
- ❑ Software management
  Specify software support activity: _____
- ❑ Spares Affected
  Specify responsible activity: _____
- ❑ COTS/NDI
- ❑ Facilities

Other (Specify): _____

12. DETAIL DESIGN CRITERIA: (Check all that apply)

- ❑ Ship Specification
- ❑ Deep Diving General Overhaul Specification
- ❑ General Specifications for Overhaul (GSO)
- ❑ Other (Specify)_____

13. ARE THERE QUALITY ASSURANCE REQUIREMENTS IN ADDITION TO STANDARD REQUIREMENTS? Yes____ No_____
If Yes, List Requirements:_____

14. REFERENCES/SUPPORTING DOCUMENTATION:

15. ESTIMATED WEIGHT AND MOMENT:

WEIGHT	VCG	LCG	TCG
Stability Statement			

16. CHANGE MATERIAL/SOFTWARE LIST:

ITEM NO.	DESCRIPTION	UNIT OF ISSUE	QUANTITY	PROCURING ACTIVITY

17. SPECIAL DISPOSITION REQUIREMENTS FOR REMOVED MATERIAL:

MATERIAL	DISPOSITION

18. INSTALLATION SUPPORT AND TEST EQUIPMENT:_____

19. SHIPBOARD STOWAGE DETAILS:_____

20. NAVSEA SHIP INFORMATION DRAWING (SID) REVIEW REQUIRED: YES___ NO___

21. SPECIAL INDUSTRIAL STOWAGE REQUIREMENTS:_____

22. REQUIRED PRIOR, CONJUNCTIVE OR CONCURRENT CHANGES:_____

23. INSTALLATION DURATION:_____

24. HUMAN SYSTEMS INTEGRATION (HSI):

Manpower/Workload:_____
Personnel:_____
Training:_____
Human Factors Engineering (HFE):_____
Habitability:_____
Environment, Safety and Occupational Health (ESOH):_____
Personnel Survivability:_____

25. CERTIFICATIONS/QUALIFICATIONS AS REQUIRED:

ILS Cert _____ Target Completion Date _____
HSI Cert _____ Target Completion Date _____
EMI Cert_____ Target Completion Date _____
WSESRB_____ Target Completion Date _____
Software Cert_____ Target Completion Date _____
Shock Qualification____ Target Completion Date _____
SPAWAR PPL/SSIL (IT-21) Cert_____ Estimated Completion Date_____
SEA 62 Interoperability Cert_____ Estimated Completion Date_____
Other Cert (Specify)_____ Target Completion Date _____
Other Cert (Specify)_____ Target Completion Date _____

26. DETAILED COST STRUCTURE:

	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	Total
System/Equipment Design/Development Cost											
Concept Development											
Preliminary Engineering											
Design Development											
Software Development											
Hardware Development											
EDM/Pre-Production Prototype											
Testing											
Program Management											
Subtotal System/Equipment Design/Development Cost											
System/Equipment Procurement Cost											
Activation Cost											
Hardware Cost											
Installation Material											
Testing (Production/Post Production)											
Developmental Testing											
Operational Testing											
H.S.I											
Training/Training Support											
Schoolhouse modification											
Installation Training											
NTSP Development/Update											
Training Development Costs											
Manpower and Personnel											
Top Down Requirements Analysis (TDRA)											
Other Manpower Workload Analysis											
Logistics											
Special Tools/Test Equipment											
Facilities											
Manpower & Personnel											
Spares (testing)											
Repair parts											
PHS&T											
Documentation (PTD)											
Certification Cost											
ILS Certification											
H.S.I Certification											
Interoperability Costs											
Program Management											
Subtotal System/Equipment Procurement Cost											
	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	Total
Installation/Checkout Cost											
Planning											
Design Services Allocation (DSA)											
SAR Development											
Shipcheck											
SID											
SSR/SRD											
ILS											
Configuration Overhaul Planning (COP)											
COSAL											
TM UPDATE											
CDM/SNAP VALIDATE											
Other ILS											
PROJECT MGMT											
Design Sevices Allocation (DSA) Non-Plng Yd											
Installation											
Shipyard (NSA)											
AIT											
Incidental Material											
Certifications											
TMA/TMI											
Topside Analysis											
Subtotal Installation/Checkout Cost											
Subtotal (Sum of Major Cost Element Categories By FY)											
Funding Phasing Plan											
	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	Total
Preliminary Engineering											
Appn/PE (Include all as required)											
Design Development											
Appn/PE (Include all as required)											
Procurement											
Appn/PE (Include all as required)											
Installation											
Appn/PE (Include all as required)											
Subtotal (By FY)											
Projected Savings and Cost Avoidance	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	FYXX	Total
Development Phase											
- Direct											
- Additional TOC Elements											
Total Development Phase											
Production Phase											
- Recurring											
- Non-recurring											
- Additional TOC Elements											
Total Production Phase											
Operating & Support											
- O-Level / Mission Personnel											
- Unit Level Consumption											
- Intermediate Maintenance											
- Depot Maintenance											
- Contractor Support											
- Sustaining Support											
- Indirect Support											
- Other											
Total Operating and Support											

27. APPROVAL RECOMMENDATION:

		Recommended	Not Recommended	Recommend Re-Work
NUCLEAR POWER DIRECTORATE (As Required)				
Signature_____	**DATE**	_____	_____	_____
SHIP PROGRAM MANAGER				
Signature_____	**DATE**	_____	_____	_____

TECHNICAL REVIEW COMMENTS:

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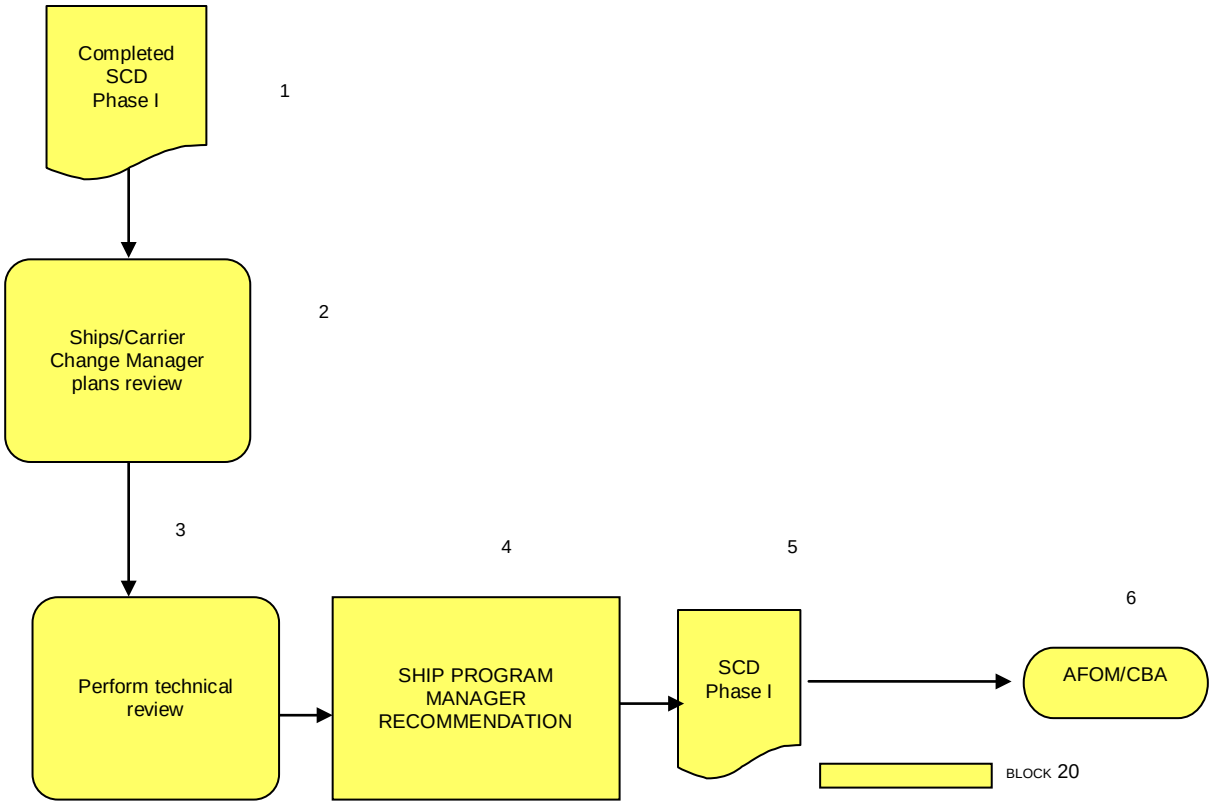
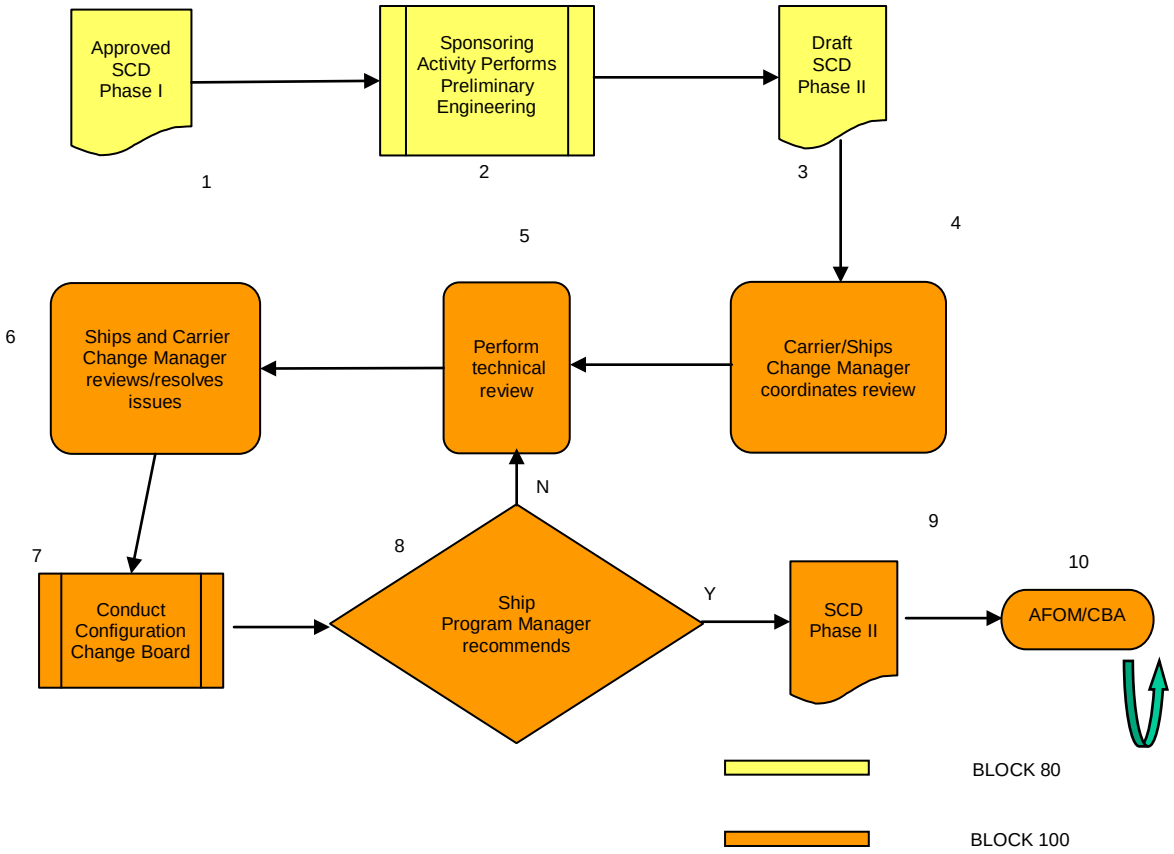
APPENDIX C

TECHNICAL ASSESSMENT FLOWCHART



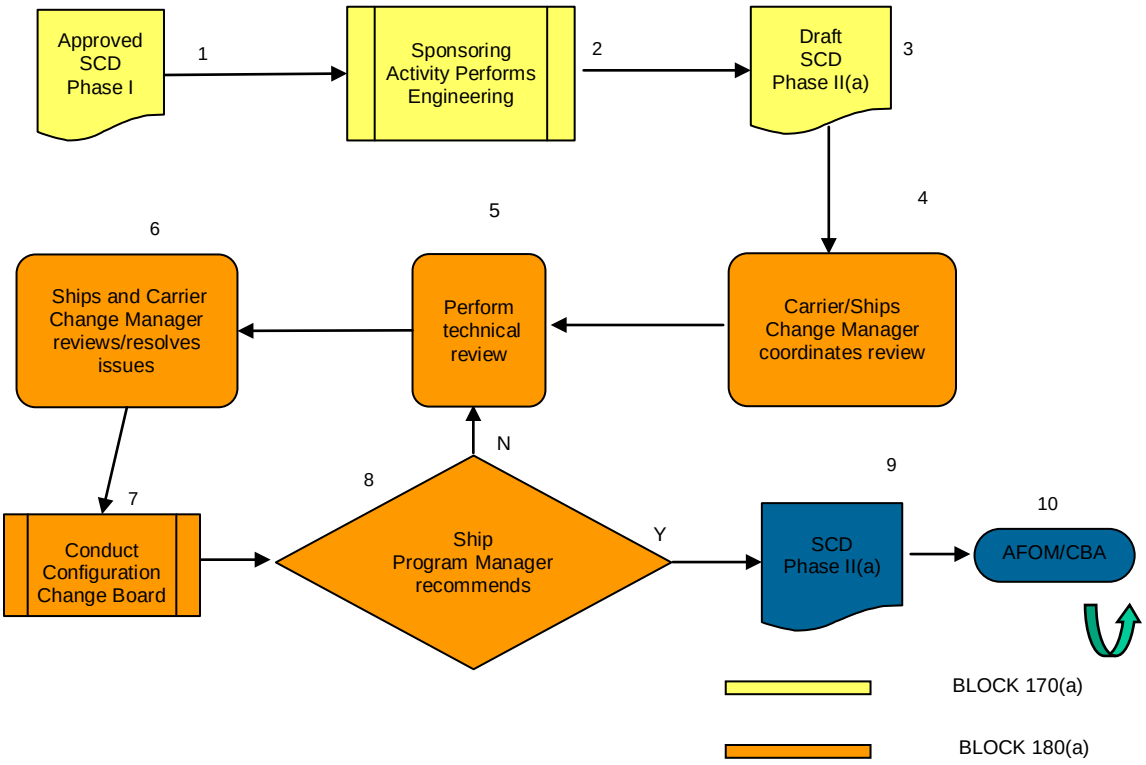
Technical Assessment Phase I

TECHNICAL ASSESSMENT FLOWCHART



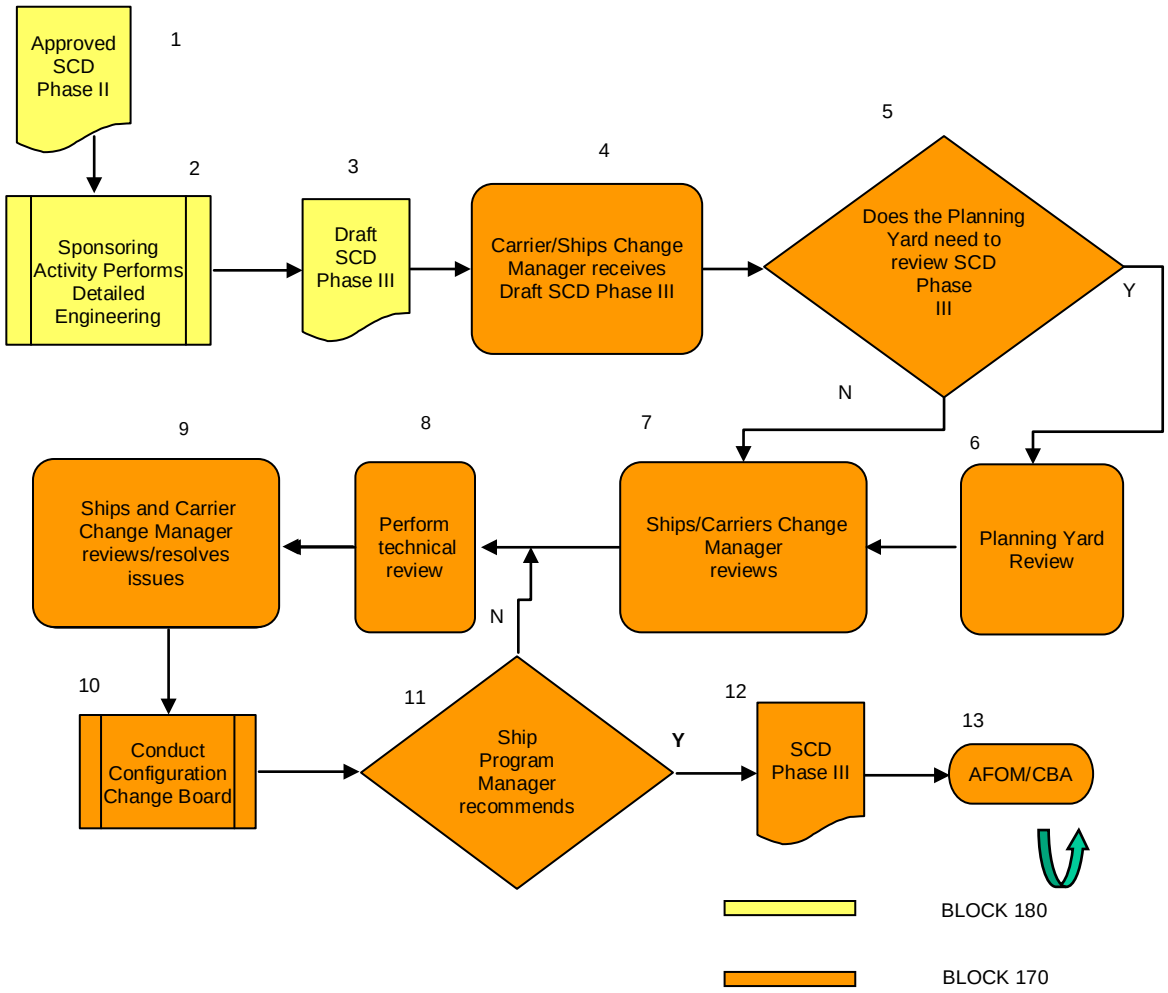
Technical Assessment Phase II

TECHNICAL ASSESSMENT FLOWCHART



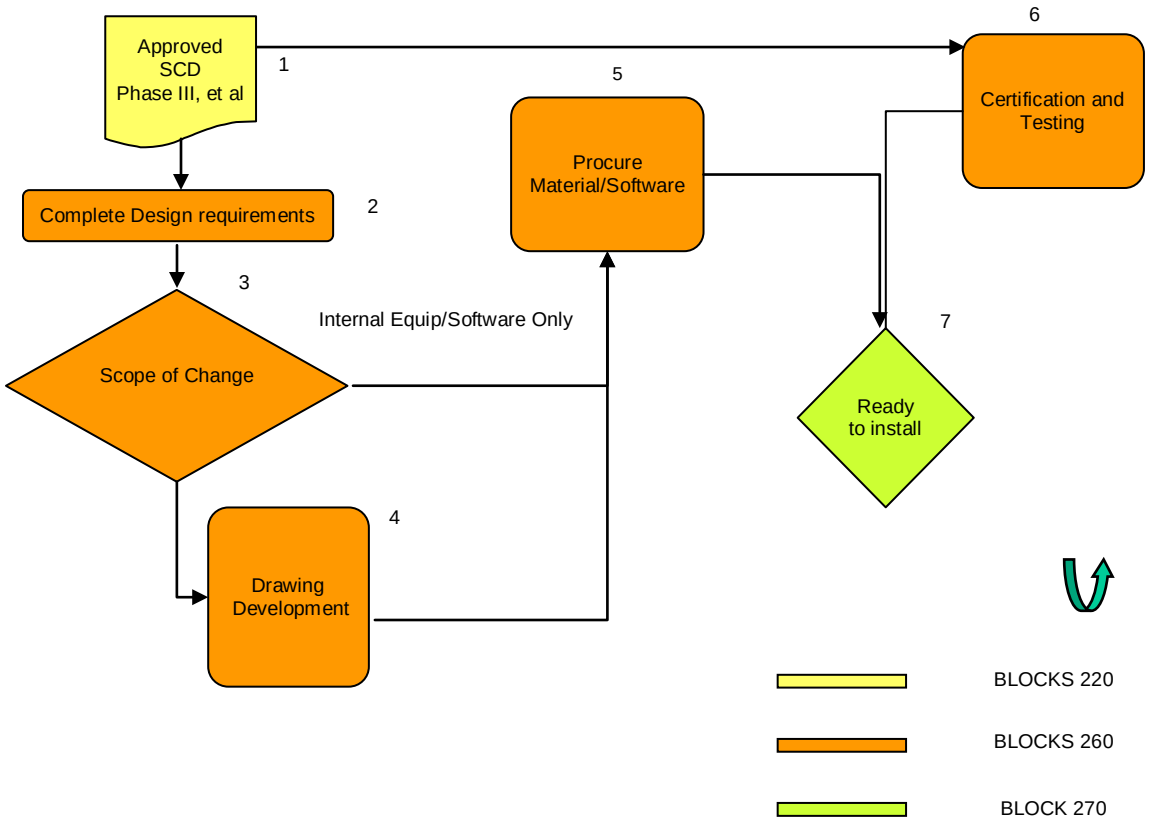
Technical Assessment Phase II(a)

TECHNICAL ASSESSMENT FLOWCHART



Technical Assessment Phase III

TECHNICAL ASSESSMENT FLOWCHART



Technical Implementation Phase IV

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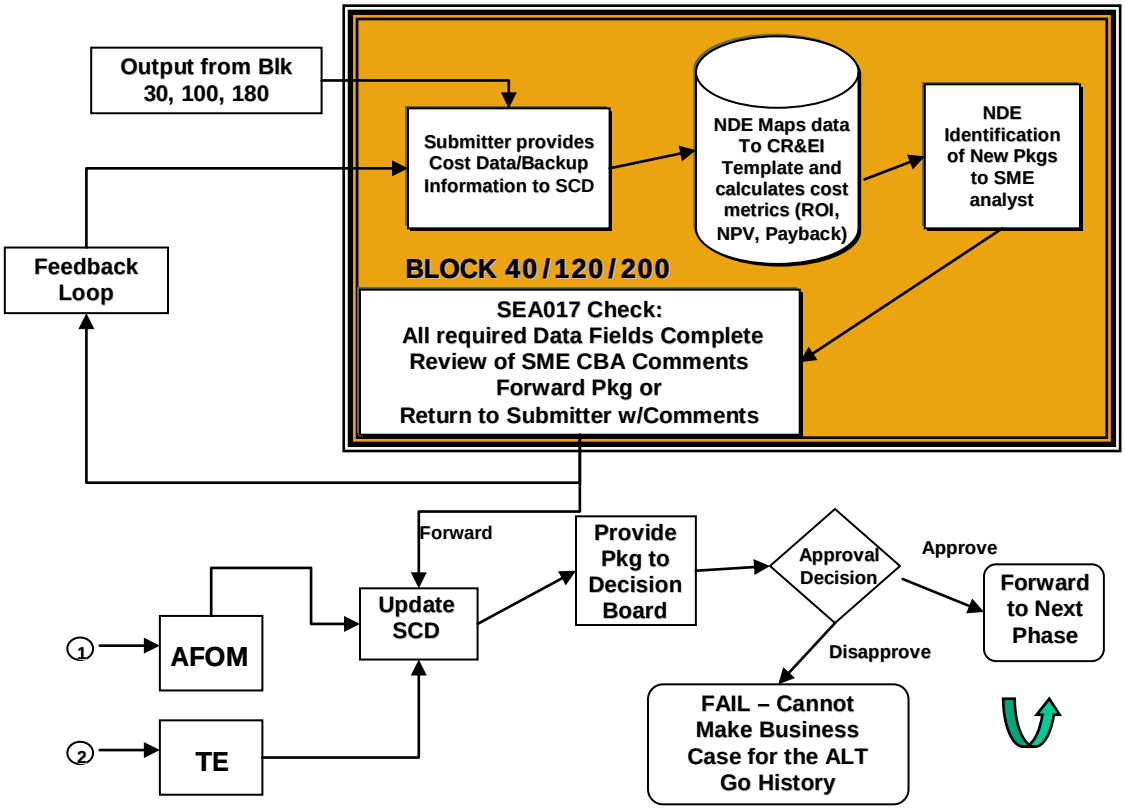
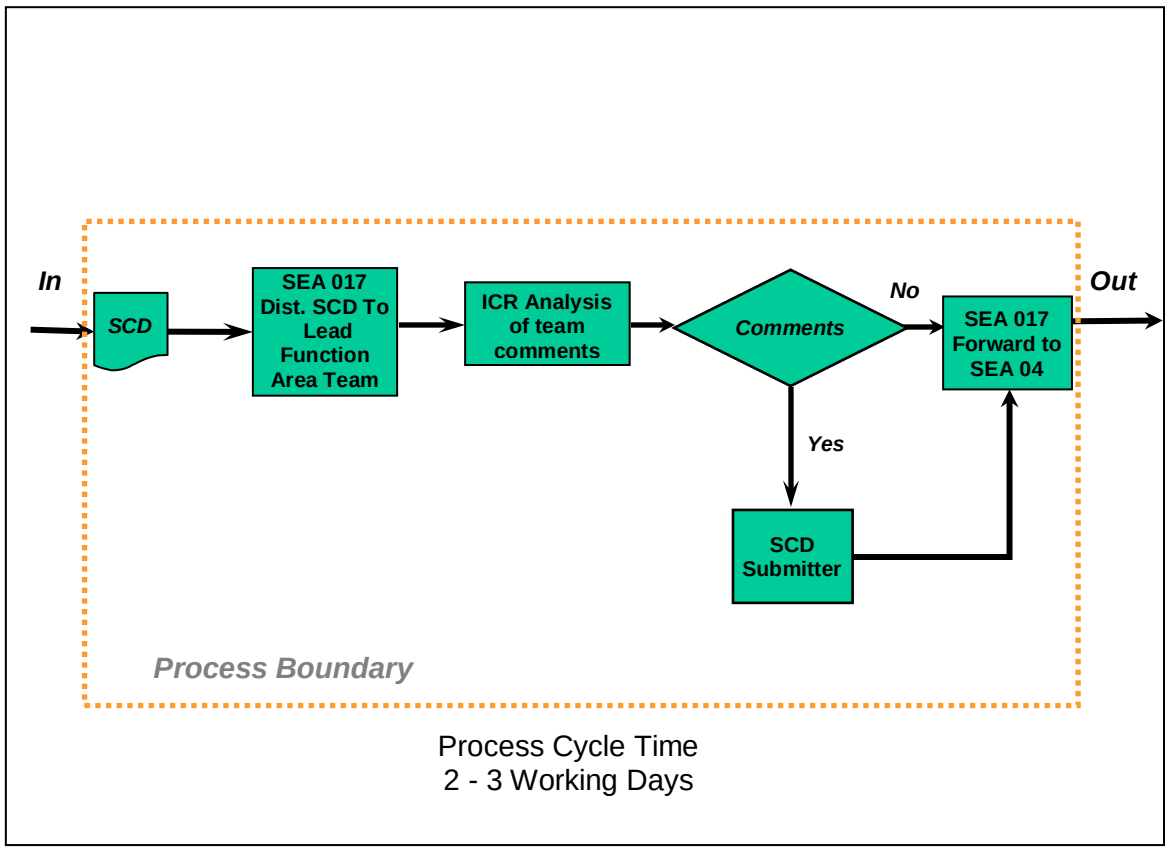
APPENDIX D

COST BENEFIT ANALYSIS FLOWCHART



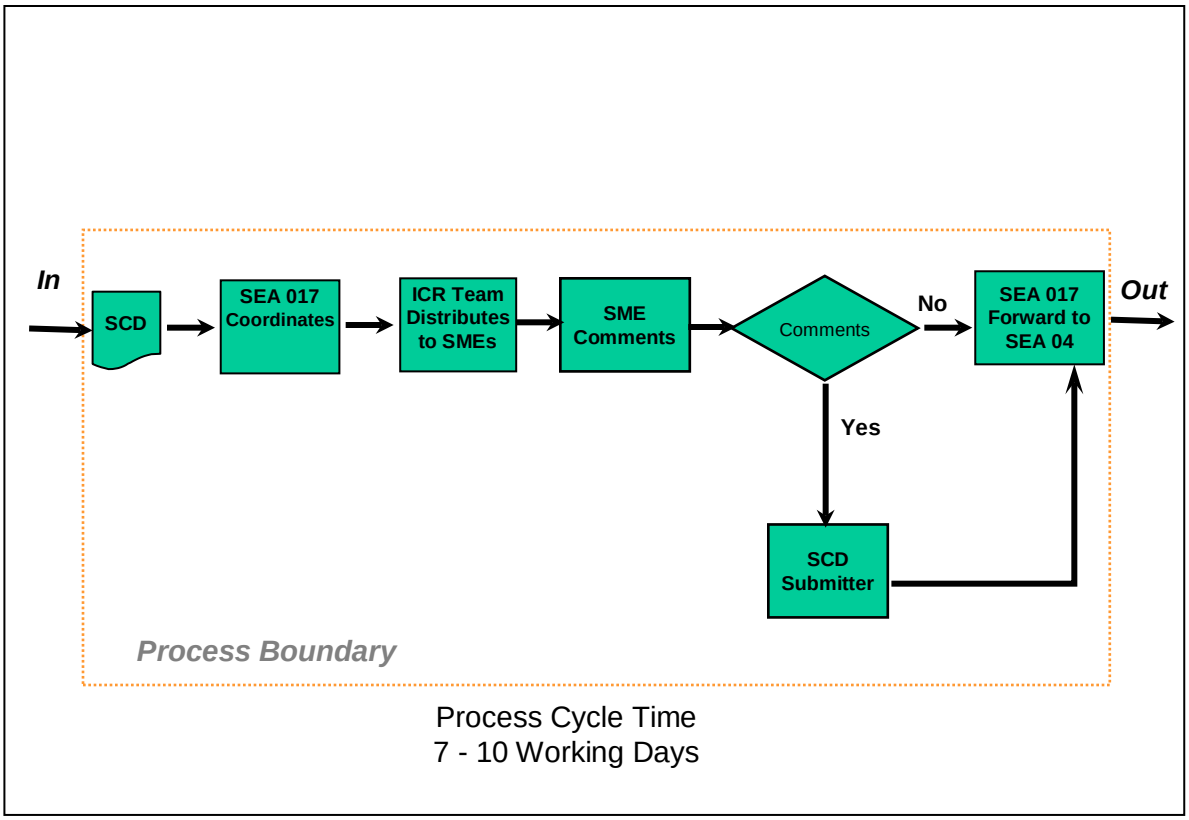
CBA PROCESS FLOW, BLKS 40/120/200

COST BENEFIT ANALYSIS FLOWCHART



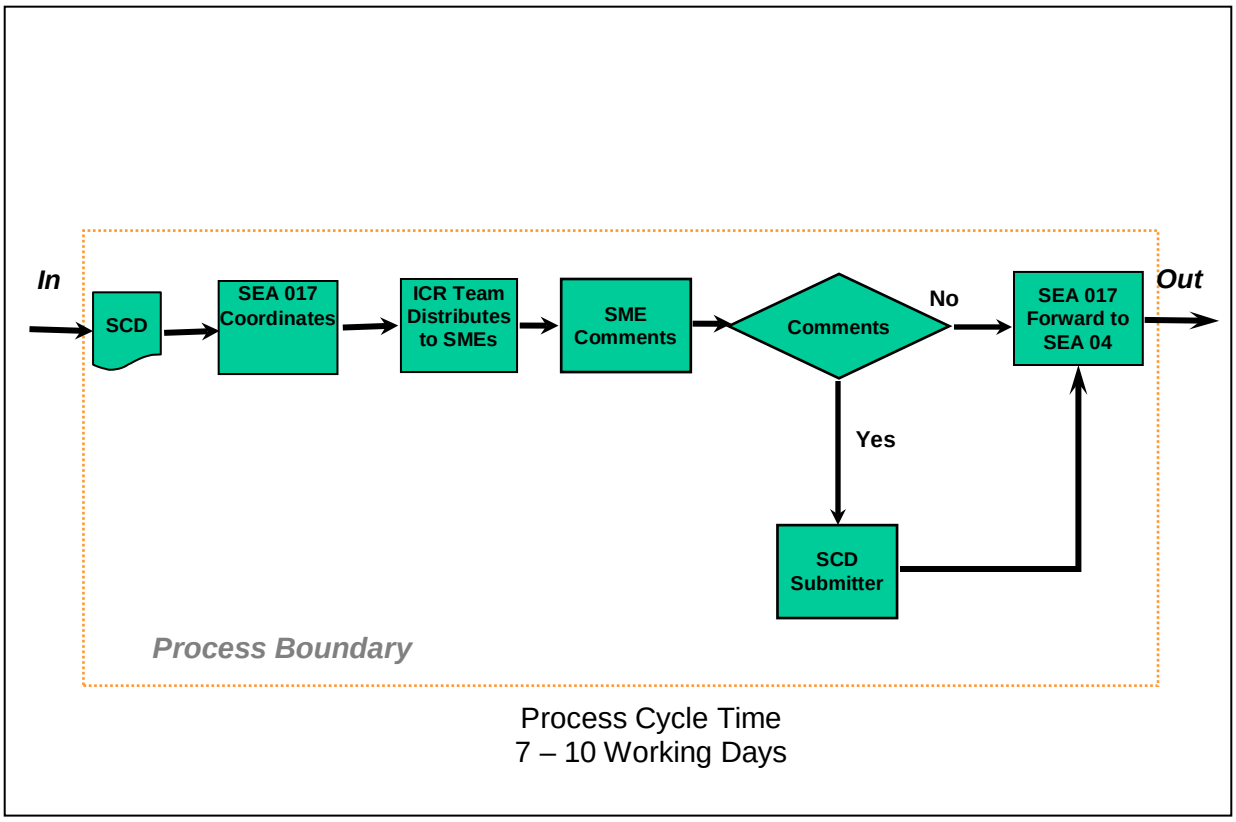
COST BENEFIT ANALYSIS (CBA)
BOX #40 - LEVEL 3

COST BENEFIT ANALYSIS FLOWCHART



UPDATE COST BENEFIT ANALYSIS (CBA)
BOX #120 - LEVEL 3

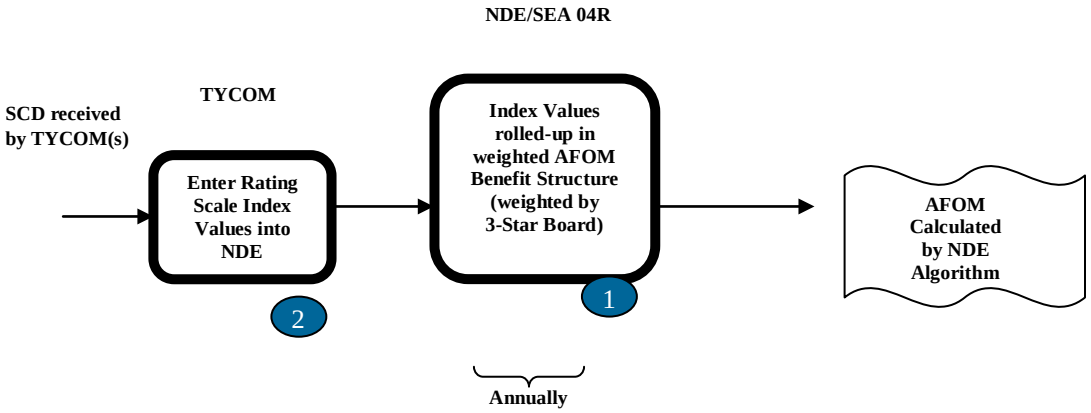
COST BENEFIT ANALYSIS FLOWCHART



UPDATE COST BENEFIT ANALYSIS (CBA)
BOX #200 - LEVEL 3

APPENDIX E

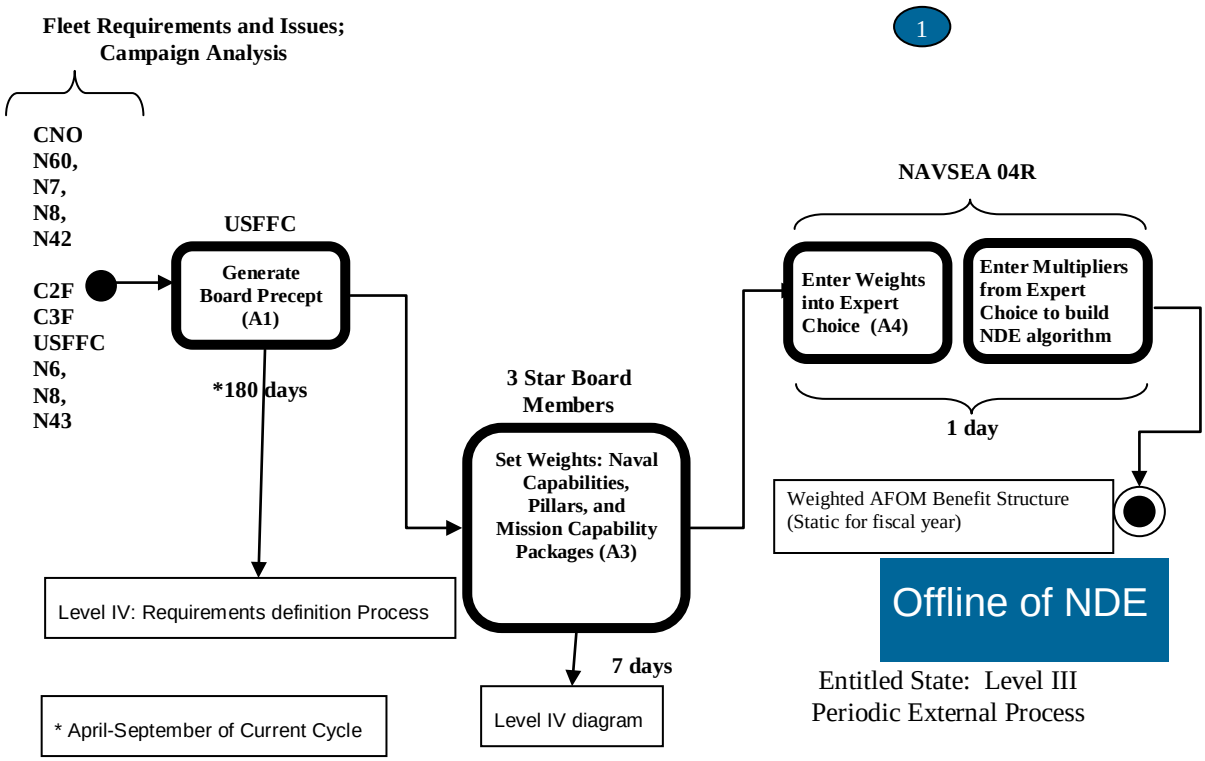
ALTERATION FIGURE OF MERIT FLOWCHART



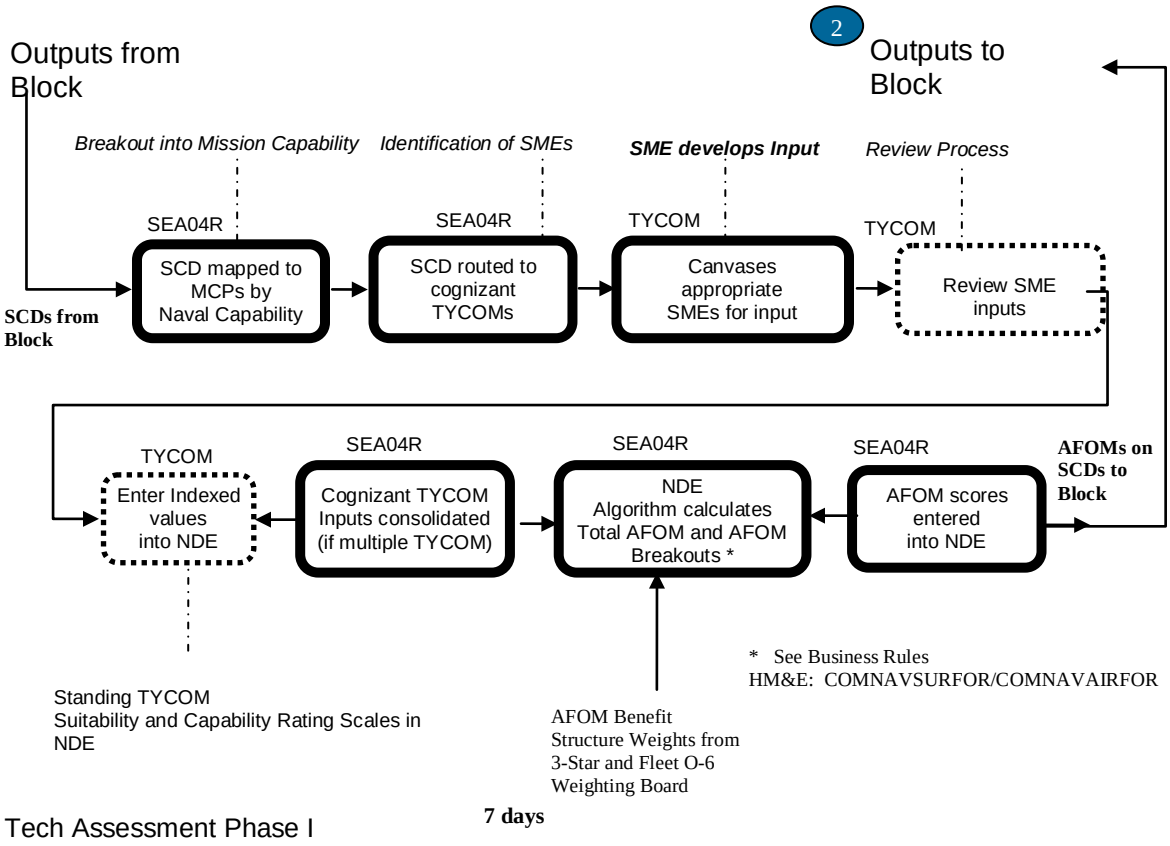
CONTINUOUS SCDs X TYCOM RATINGS X NAVY PRIORITIES (WEIGHTS)=AFOM VALUE

AFOM PROCESS (INITIAL AND UPDATE)

ALTERATION FIGURE OF MERIT FLOWCHART

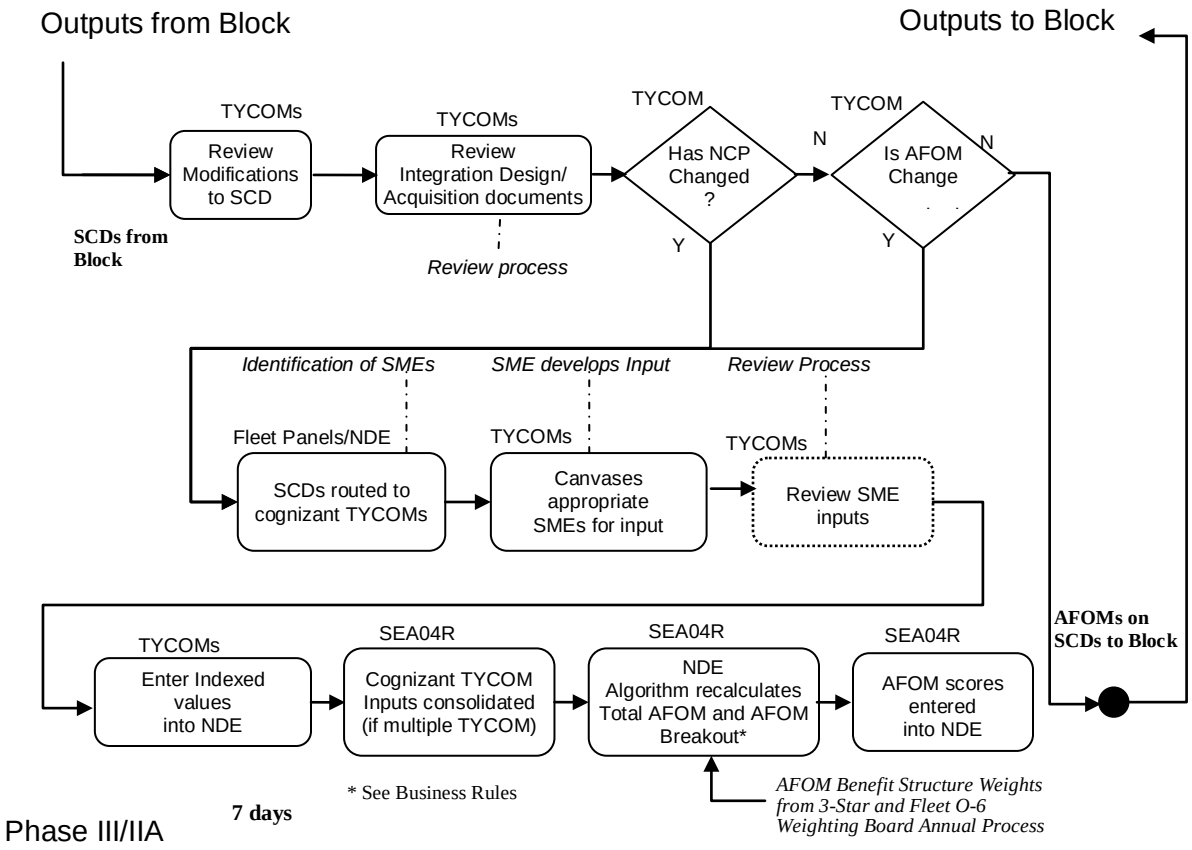


ALTERATION FIGURE OF MERIT FLOWCHART



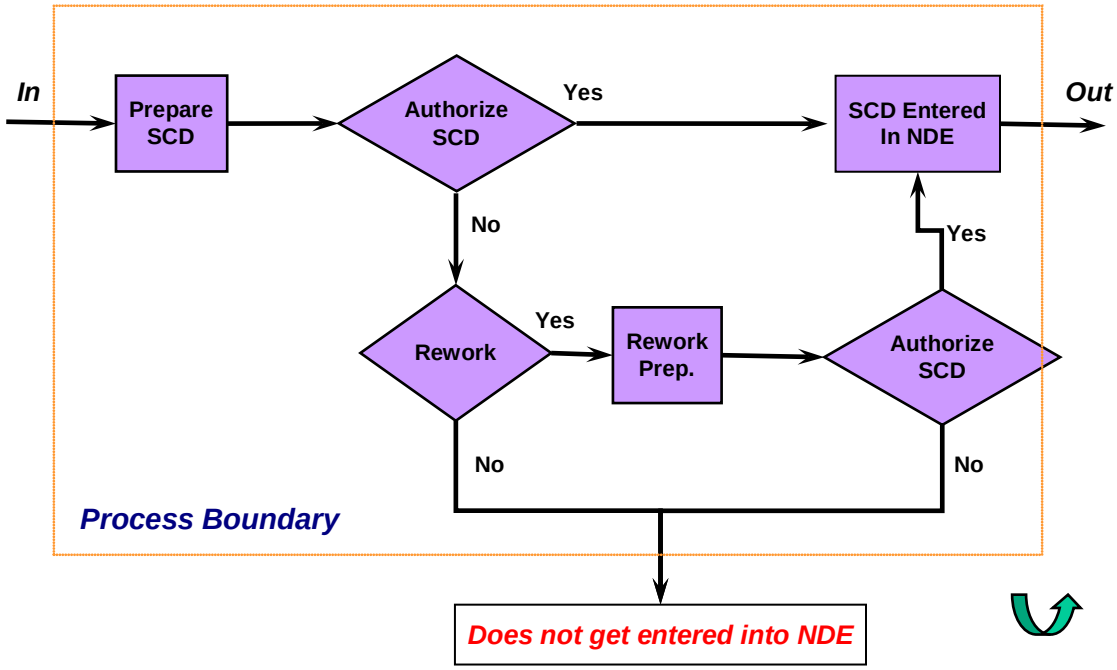
PROCESS FLOW (LEVEL III)
- CALCULATE INITIAL AFOM

ALTERATION FIGURE OF MERIT FLOWCHART



APPENDIX F

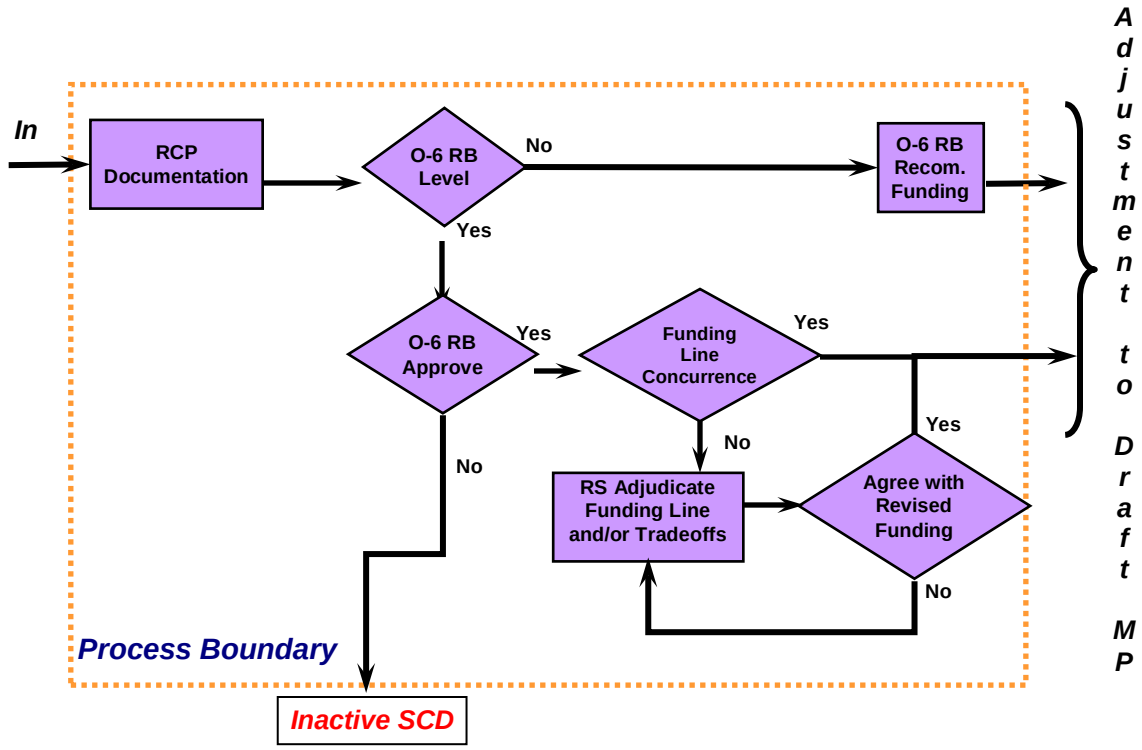
VOTING DATABASE FLOWCHART



CREATE SHIP CHANGE DOCUMENT (SCD)
BOX #10 - LEVEL 3

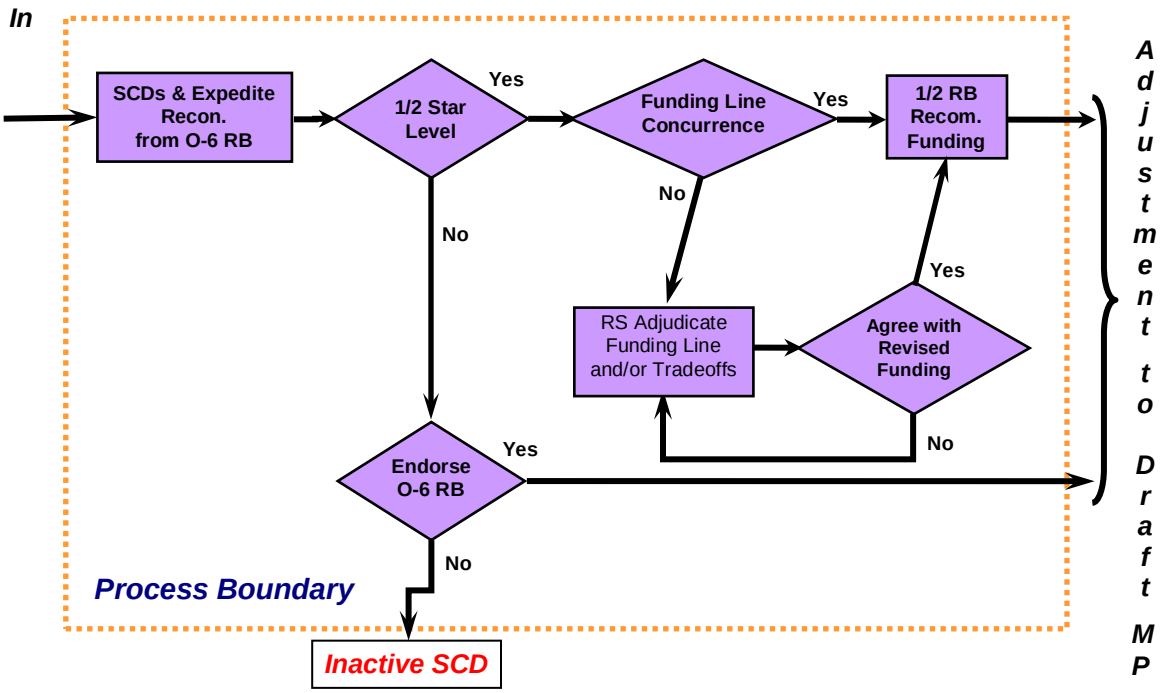
PROCESS FLOW (LEVEL III)
BLOCK - 2ND UPDATE AFOM

VOTING DATABASE FLOWCHART



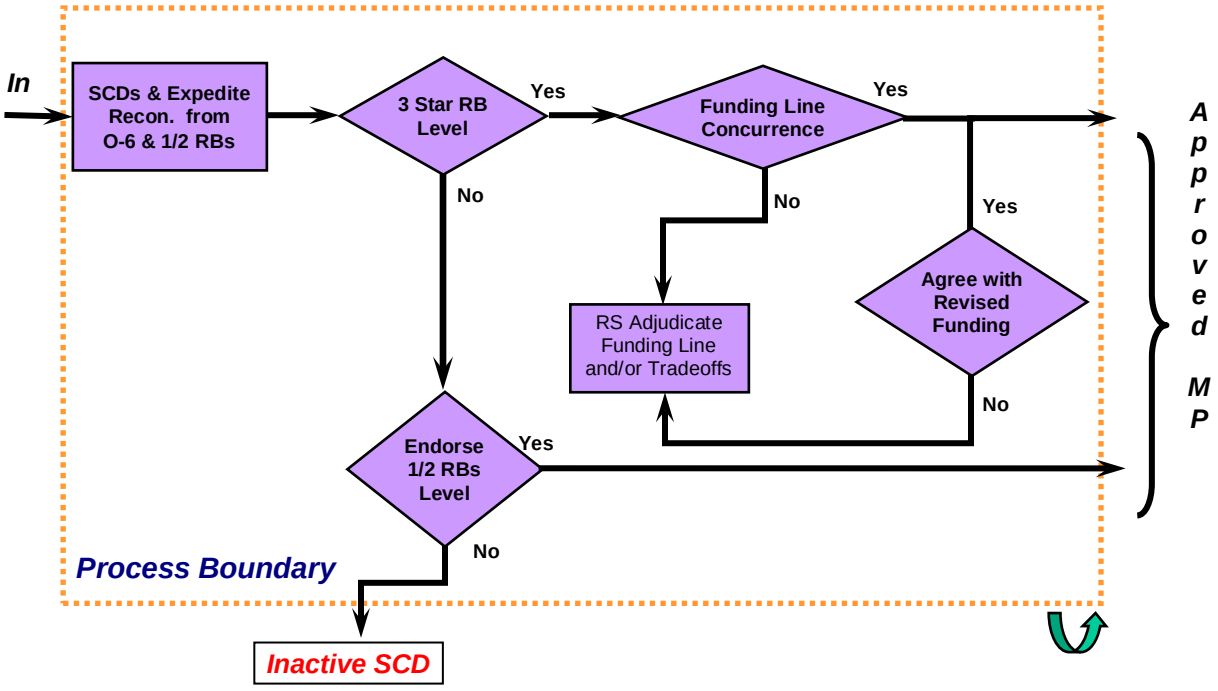
DECISION POINT 1 - O6 REVIEW BOARD
AUTHORIZE FUNDING FOR PREL. ENGINEERING
(BOX #60 - LEVEL 3)

VOTING DATABASE FLOWCHART



DECISION POINT 1 - 1/2 STAR REVIEW BOARD
AUTHORIZE FUNDING FOR PREL. ENGINEERING
(BOX #60 - LEVEL 3)

VOTING DATABASE FLOWCHART



DECISION POINT 1 - 3 STAR REVIEW BOARD
AUTHORIZE FUNDING FOR PREL. ENGINEERING
(BOX #60 - LEVEL 3)

VOLUME VI

CHAPTER 37

REGIONAL MAINTENANCE CENTER PASSIVE COUNTERMEASURE SYSTEM SUPPORT REQUIREMENTS

REFERENCES.

(a) OPNAVINST 9070.2 - Signature Control Policy for Ships and Craft of the U.S. Navy
(b) NAVSEA CERT 05P1 - Passive Countermeasure System (PCMS) Regional Maintenance Center Certification Plan
(c) NAVSEA SE400-DA-MMO-010 - Passive Countermeasure System (PCMS) Technical Manual
(d) Maintenance Index Page 4721/081 - Passive Countermeasure System (PCMS)
(e) NAVSEA RIM 05T1-99 - PCMS Repair and Installation Methods
(f) NAVSEA ACD 05T1-05 - PCMS Access, Material Control and Disposal Manual
(g) NAVSEA ACD/J 05T1-05 - PCMS Access, Material Control and Disposal Manual (Japan)

37.1 PURPOSE. In accordance with reference (a), to provide guidance in the execution of a shore based Passive Countermeasure System (PCMS) maintenance program in the U.S. Surface and Submarine Fleets.

37.1.1 Background. Waterfront support for the PCMS is focused through the homeport Regional Maintenance Center (RMC). To support the Fleet PCMS program each RMC shall be capable of conducting the following core PCMS activities:

a. PCMS Readiness Improvement Program (RIP). Stand alone on board technical training (PCMS Supervisor or Maintainer) may be provided to ships if delivering that training via the RIP process is not possible.

b. Installation and removal of Motion Measurement System.

c. Conduct of the AP-1 Intrusion Countermeasure Procedure system assessments.

d. Technical assists.

e. Prioritization and quality assurance of all topside work, executed under the authority of the former SUPSHIP organization, related to or impacting PCMS.

Resources and procedures required for these tasks are identified in reference (b). A general system description is provided in reference (c).

37.2 PASSIVE COUNTERMEASURE SYSTEM EVENT DESCRIPTION.

a. PCMS RIP. RIPs are scheduled by the Type Commander (TYCOM) via the Immediate Superiors In Command. Immediate Superiors In Command obtain primary and secondary dates, submit via message action to TYCOM with information to the local RMC. This two-week long event is designed to provide on board training to the entire ship PCMS team, focused on maintenance and inspection training. Curricula are available for both the maintenance person and supervisor courses. The latter includes an effectiveness module, which is classified SECRET. Week one focuses on one day of training, followed by corrosion control of selected areas and trim/caulk of other areas. Week two continues the trim/caulk effort plus installs new tile in areas where corrosion control has been completed. This is the primary method of delivering training and PCMS certification for Ship's Force personnel. It also serves the purpose of providing a focused period for resourcing and accomplishment of a prioritized selection of Ship's Force capable maintenance.

b. Motion Measurement System. In accordance with references (d) and (e), ships without installed telemetry equipment require installation and removal of Motion Measurement System for radar cross-section testing. This is accomplished by the RMC following ship submission of a 2K request.

c. AP-1 and AP-2 Intrusion Countermeasure Procedure assessment. These comprise the annual Subject Matter Expert (SME) assessment of the ship system. It utilizes a visual assessment process in order to provide a prioritized maintenance plan for the ship. This complements the ship's 18M-1R. A structured discipline is used for this assessment. SMEs are trained in this discipline in accordance with reference (b).

d. Technical assistance. RMC SMEs are responsible for responding to Forces Afloat requests for PCMS technical assistance.

e. PCMS Supervisor and Maintenance On Board Training. When the RIP schedule does not permit timely accomplishment of on board maintenance training required to support Ship's Force actions required by reference (d). Such events shall be undertaken on a not to interfere basis with the other priorities detailed in paragraph 37.1.1 of this chapter. Every effort shall be made to accommodate all ship on board maintenance training through the RIP process.

f. Prioritization and Quality Assurance of I and D Level Work. RMC SMEs shall be utilized by the RMCs to provide technical advice, including work prioritization, and quality assurance of all I and D Level PCMS related or PCMS impacting work executed under the purview of the RMC.

37.3 PASSIVE COUNTERMEASURE SYSTEM PERSONNEL CERTIFICATION.

37.3.1 Passive Countermeasure System In-Service Engineering Activity. The Naval Sea Systems Command (NAVSEA) Topside Signatures Warrant Holder has assigned the PCMS In-Service Engineering Agent (ISEA). The Topside Signatures Warrant Holder retains final authority for all PCMS personnel certification.

37.3.2 Training Requirements. In accordance with reference (c), NAVSEA 05P1 has established the requirement that all personnel involved in PCMS installation and maintenance, including inspection/assessment, surface preparation, material application, final painting or quality assurance, shall be U.S. citizens trained in the specifics of PCMS installation procedures prior to any actual tile installation work. As waterfront experience has underscored the absolute importance of limiting PCMS work to properly trained personnel, the certification process is the single most important element of quality assurance for the fleet customer. All personnel assigned PCMS duties shall be trained in the requirements of reference (f).

37.3.3 Support Personnel. In accordance with reference (d), PCMS personnel certification is required every three years. Qualifications for PCMS certification are successful completion of NAVSEA sponsored PCMS installation course conducted under the authority of Port Hueneme Detachment (PHD) Naval Surface Warfare Center (NSWC) (S22) and on-the-job-training witnessed by a certified PCMS instructor within the past three years. RMC SME personnel are also required to retain proficiency through annual accomplishment of at least one AP-1 and one RIP. This certification enables RMCs and shipyards to maintain a cadre of qualified PCMS personnel and with the assistance of the PCMS ISEA, to coordinate further certification or recertification training as required. Specific certification levels are addressed in the relevant PCMS Program NAVSEA manual.

37.3.4 Japan Regional Maintenance Center and Pearl Harbor Naval Shipyard. Due to the special circumstances of the Forward Deployed Naval Forces, Japan Regional Maintenance Center and Pearl Harbor Naval Shipyard are authorized to execute training of personnel organic to their production codes for all PCMS maintenance and installation work using the PCMS ISEA provided training guide. Training materials used to train Fleet sailors and U.S. contractors cannot be used to instruct Japan Regional Maintenance Center or Pearl Harbor Naval Shipyard organic personnel. Reference (g) provide guidance particular to Japan based support.

37.3.5 Ship's Force Personnel. In accordance with the requirements of reference (c) MRC S-1, fleet personnel conducting PCMS assessments must be graduates of a PCMS ISEA approved ship supervisor course which includes an assessment/inspection training module. Ship's Force personnel assigned maintenance duties to include all reference (c) MRCs **except** the S-1 must be graduates of the PCMS ISEA approved PCMS maintainer course.

37.4 PASSIVE COUNTERMEASURE SYSTEM TECHNICAL ASSISTANCE.

37.4.1 Technical Assistance. PCMS technical assistance is available through distance support at the local RMC.

37.5 RESPONSIBILITIES.

a. Commander, Naval Sea Systems Command:

(1) Certify personnel, facilities, and activities in PCMS handling, Quality Assurance, application, and destruction, maintaining records for each certification.

(2) Provide Equipment Guide List (EGL) packages for AP-1, AP-2 and S-1 assessments.

(3) Incorporate and distribute ship configuration revisions submitted following AP-1 and AP-2 assessments.

(4) Conduct analysis of all 18M-1R measurements and provide Forces Afloat reports of results and recommendations.

(5) Adjudicate all PCMS related requests for Departures from Specifications.

(6) Designate a PCMS ISEA to function as the first line technical resource for Forces Afloat.

(7) Coordinate PCMS in service activities with the broader Surface Maintenance Engineering Planning Program Activity (SURFMEPP) organization and other activities, such as corrosion control programs.

b. Navy Regional Maintenance Command:

(1) Ensure that RMCs have adequate PCMS SMEs/technicians to support PCMS core activities. Provide stewardship of RMC SMEs to ensure a seamless transition when personnel are scheduled for transfer or retirement. If qualified PCMS Technicians are not available at local RMC, the RMC should contact the following (in order of contact) for assistance:

(a) Other RMCs.

(b) PCMS ISEA (NSWC PHD). This request shall include funding for the performance of the activity.

(2) Ensure integration of PCMS SME support to all former SUPSHIP planning and execution of shipboard repairs and other upkeep performed under the auspices of the RMC organization.

(3) Establish I-level PCMS tiling support shops at RMCs with PCMS responsibilities.

(4) Ensure the integration of PCMS restoration on all RMC conducted repairs and corrosion control projects where PCMS coverage is required. This is to be focused on ship-shop level projects which are most efficiently accomplished inside of a production shop prior to return aboard ship.

c. Type Commanders shall:

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

(2) Refer all PCMS related Departures from Specifications to NAVSEA for adjudication..

(3) Prior to promulgation, review and authorize all documents prepared by technical agencies that contain procedures relative to PCMS and the fleet PCMS program.

(4) Evaluate comments and recommendations regarding the fleet PCMS program. If necessary, promulgate changes to existing policy and procedures.

(5) Fund PCMS RIPs to provide for the additional RMC labor and material required to conduct these events at least bi-annually.

(6) Ensure that proper corrosion control procedures are employed in the planning and execution of I and D Level maintenance affecting PCMS areas. Reference (e) provides detailed guidance.

d. Immediate Superiors in the Chain of Command (ISIC) shall:

(1) Submit requests to schedule PCMS core activities for each unit to maintain unit currency in trained personnel and 18M-1R assessments. PCMS RIPs shall be conducted at an interval not to exceed 24 months.

(2) Review and take the appropriate action to correct PCMS discrepancies for subordinate units.

e. RMCs shall:

(1) Maintain qualified PCMS personnel and ensure assets are available to perform PCMS core activities in accordance with reference (b).

(2) Provide Technical Assistance via distance support/on site visit as appropriate.

(3) Conduct PCMS core activities. Provide the following to the PCMS ISEA within four weeks following AP-1 events:

(a) Redlined updates to key plans and detailed drawings.

(b) Completed EGL inspection checklist, including revised items.

(c) Completed digital photo survey.

(4) Ensure all personnel assigned to PCMS responsibilities meet the requirements of reference (b).

(5) Ensure that RMC PCMS SMEs are involved in planning of all PCMS equipped ship topside maintenance where PCMS is affected.

(6) Ensure that RMC Quality Assurance personnel, certified by the PCMS ISEA, are actively involved in the Quality Assurance of all I and D level PCMS related repairs and installations.

(7) Ensure that contracted or I-level jobs activities, facilities and personnel selected to conduct PCMS work are certified for the work being conducted.

(8) Include in contracted I and D-level jobs the provision of PCMS tiles for planned PCMS repairs and interference areas. Ships shall not be tasked to provide tiles or other PCMS Allowance Parts List/Allowance Equipage List items to support work undertaken by other than Ship's Force, except with the specific concurrence of the TYCOM.

f. Surface Ship Commanding Officers shall ensure:

(1) Scheduling of PCMS activities within periodicity.

(2) Obtaining RMC SME assistance in reviewing work packages to ensure identification of all topside signature related issues.

(3) Establishment and maintaining of the following shipboard organization:

(a) PCMS Department Head: in accordance with reference (a), the Commanding Officer shall appoint a Department Head responsible for coordinating operation and maintenance of PCMS. Their responsibilities include:

1 Providing the Commanding Officer monthly PCMS effectiveness summaries including major PCMS deficiencies, the compliance of the ship with personnel certification requirements, an abbreviated Plan of Action and Milestones for correction of Category 1/2/3 deficiencies and corrosion items, and the due date for the next 18M-1R.

2 Coordinating shipboard PCMS indoctrination for newly reported personnel.

3 Coordinating ship-wide PCMS preventive and corrective maintenance schedule.

4 Coordinating distribution and update of Planned Maintenance System (PMS) materials including ship specific PCMS keyplan drawings and EGLs required for PMS inspections.

5 Serving as single point of contact for Quality Assurance of PCMS related Current Ship's Maintenance Project entries, review of all topside configuration changes (including program alterations, fleet alterations, field changes, etc.) to ensure Radar Cross Section reduction has been considered.

6 Ensuring PCMS is included in the command PMS spotcheck program.

7 Assigning a command PCMS coordinator responsible to the PCMS Department Head for the detailed implementation of PCMS maintenance and operation.

(b) Command PCMS coordinator: The command PCMS coordinator is the primary assistant to the PCMS Department Head in carrying out responsibilities outlined in paragraph 37.5 f.(3)(a) of this chapter. Additional responsibilities include:

1 Request PCMS RIPs at intervals not to exceed 24 months.

2 Designate team of minimum 8 people (DDG/FFG/LPD)/15 people (CVN/GG). This team must include at least two supervisor level personnel (E5 and above). These team members shall be committed throughout the entire RIP duration and cannot be substituted once the RIP commences.

3 Commit this team to the full 10 day period, arranging other individual requirements/commitments around the PCMS RIP. The names/rates/PRD of these personnel shall be provided to the local RMC SME by email or record message not later than 3 working days prior to the PCMS RIP. The senior Ship's Force member of this team is responsible as the team's mustering petty officer and shall exercise military control of the team. Personnel may not be substituted once the RIP has begun.

(c) Supply Officer: Maintain Allowance Parts List stocks of PCMS materials and sufficient Allowance Equipage List items to support maintenance requirements. All shipboard stocks must be within shelf life.

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VOLUME VI

CHAPTER 38

DEEP SUBMERGENCE SYSTEMS HULL INTEGRITY PROCEDURES

REFERENCES.

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

LISTING OF APPENDICES.

A SUBMEPP DSS HIP Inventory
B SUBMEPP DSS HIP Schedule
C Request for DSS HIP Periodicity Extension Format

38.1 PURPOSE. This chapter provides guidance and definition for the requirements, responsibilities and actions for Deep Submergence Systems (DSS) Hull Integrity Procedures (HIP) to continue certification for manned operations. The DSS HIP program is invoked on Dry Deck Shelter (DDS) and Advanced SEAL Delivery System (ASDS) certified under reference (a).

38.2 HULL INTEGRITY PROCEDURES MAINTENANCE SCHEDULING, PLANNING AND REPORTING.

38.2.1 Maintenance Requirements for Continued Certification. Reference (a) establishes the Maintenance Requirements and identifies the responsibilities and actions required to support continued unrestricted Submarine/DSS manned operations. In conjunction with reference (a), Naval Sea Systems Command (NAVSEA) has issued individual manuals containing required, periodic Scope of Certification (SOC) maintenance actions for each DSS. The DSS HIP procedures identify degradation of the material condition of the hull integrity boundary and of those systems affecting occupant safety. SOC certification indicates that a valid recommendation for continued manned operations can be made. Maintenance of certification is dependent on the positive control of all re-entries into the SOC boundaries per Volume V, Part III, Chapter 5 of this manual, the satisfactory and timely completion of applicable DSS HIP procedures as required by reference (a) and any necessary repairs. Accomplishment of the DSS HIPs specified with this program identify changes within the SOC boundary which result from inadvertent error and/or from degradation caused by the service environment.

38.2.2 Scheduling and Reporting. To enable the Type Commanders (TYCOM) to carry out their responsibilities in the maintenance of certification of DSSs and to aid in decisions concerning operational restrictions, an auditable system of scheduling the performance and reporting of DSS HIPs has been developed. This system provides visibility to problem areas, facilitates verification and provides a permanent record of DSS HIP accomplishment in the DSS's Maintenance and Material Management (3-M) machinery history maintained at the NAVSEA Logistics Center.

38.2.2.1 Dry Deck Shelter and Advanced SEAL Delivery System. Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity provided Periodic Maintenance Requirement (PMR) inventories and schedules are used for scheduling and reporting. The scheduled DSS HIP requirements are added to the Current Ship's Maintenance Project (CSMP) from the local scheduling system and the Automated Work Requests (AWR) produced. Appendices A and B of this chapter show examples of the SUBMEPP DSS HIP inventories and schedules respectively.

38.2.2.2 Submarine Maintenance Engineering, Planning and Procurement Activity Inventories and Schedules. The SUBMEPP inventories and schedules are provided quarterly. The SUBMEPP schedules reflect all DSS HIP requirements coming due within the next 9 months. A description of the data elements used in the inventories and schedules is provided with each issue.

38.2.3 Baseline and Due Dates. The baseline date for determining DSS HIP due dates is the Last Maintenance Action (LMA) date. LMA dates for new requirements will be based on the Change Issue Date of the DSS HIP invoking the new requirement unless otherwise directed from NAVSEA. Due dates are calculated based on LMA dates in accordance with paragraph 38.2.3.2 of this chapter. It is recognized that upkeep schedules for vehicles

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 DSS HIP will be addressed on a case-by-case basis as specified in Volume V, Part I, Chapter 8 or Volume V, Part III, Chapter 8 of this manual. LMA dates and DSS HIP due dates are determined as follows:

38.2.3.1 Last Maintenance Action Date. All DSS HIPs have an initial LMA date established at installation to start the operating cycle in accordance with the applicable DSS HIP manual. During the operating cycle, an adjusted LMA, as discussed below, is used for DSS HIP. Calculate the adjusted LMA date as follows:

a. If the PMR is accomplished during a period other than a scheduled Availability (e.g., voyage repair periods, at sea, port calls, Fleet Maintenance Activity (FMA) Availability, refit, upkeep, 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 availability (e.g., Overhaul or Restricted Availability), the adjusted LMA date will be the first of the month following the scheduled availability's actual completion date.

38.2.3.2 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 2005 (2/05) with a six month periodicity would be due in August 2005 (8/05)). The PMR will be accomplished prior to midnight of the last calendar day of the month due.

38.2.4 Periodicity Extensions. When determining the due date for certain DSS HIPs inspections, inactive time may be excluded from the time elapsed since the last inspection. Extensions of periodicity from the next due date identified in the SUBMEPP PMR inventory for these DSS HIPs can be requested by the TYCOM and require NAVSEA approval. However, they are not automatic and such requests shall be submitted by letter, in the format of Appendix C 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 DSS's PMR inventories and schedules.

38.2.5 Scheduling, Planning and Reporting Hull Integrity Procedure Accomplishment at Sustaining Activity/Fleet Maintenance Activity Level.

38.2.5.1 Scheduling. The TYCOM PMR Scheduling System Inventories and Schedules are distributed by SUBMEPP to the appropriate Immediate Superior In Command (ISIC) every quarter. A copy of each Compact Disk (CD) is to be provided to each applicable vehicle by the ISIC. As a minimum, ISICs will schedule applicable DSS HIPs 60 days prior to scheduled availabilities. Those DSS HIP AWRs requiring work packages or other planning are forwarded to the FMA Planning Section. In the case of operational type DSS HIPs the AWRs are sent to Ship's Force Lead Work Center (LWC) 991.

38.2.5.2 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 Work Center for accomplishment. For Ship's Force accomplishment of DSS HIP, the ISIC will provide an AWR to the vehicle.

38.2.5.3 Reporting to the Maintenance and Material Management (3-M) System. Each DSS HIP 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 DSS HIPs 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. Sustaining Activities completing DSS HIP AWRs are to fill in the AWR with action taken codes and suffix of A, B or C for material condition assessment, if applicable. Sustaining Activity 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.

b. FMA LWCs completing DSS HIP AWRs must ensure that all assist Work Centers 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 Work Centers 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. Until there is a fleet scheduling system in use, PMR Schedules and Inventories should be annotated to indicate completion and forwarded to SUBMEPP.

38.2.6 Deep Submergence System Hull Integrity Procedures Accomplishment During Maintenance Availabilities.

a. The Availability Work Package (AWP) prepared by SUBMEPP will reflect all DSS HIPs authorized for accomplishment during the availability at the AWP Ship Work List Item Number level.

b. For DSS HIPs assigned to the depot, the ISIC will enter "Assigned to <depot name> by AWP <AWP number>" in the Remarks/Completion block of the DSS HIP Schedule/Inventory and in the local scheduling system.

c. The ISIC will verify that all DSS HIPs assigned to the depot were reported and subsequently updated by SUBMEPP.

38.2.7 Deep Submergence System Hull Integrity Procedures Completion Reporting.

a. Within 30 days after the completion of an availability the activity accomplishing the DSS HIP is required to provide a report of accomplishment to SUBMEPP and the DSS ISIC as well as other technical codes as designated in the DSS HIP. Specific information to be included in the report is identified in the applicable DSS HIP. The accomplishing activity shall retain a legible copy of the most current inspection report until disposal of the DSS.

b. Prior to Manned Operations, the industrial activity accomplishing the DSS HIP is required to provide the DSS Sustaining Activity 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.

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 DSS HIP and, if applicable, the AWP. This special report shall be provided immediately to NAVSEA (PMS 399)(SEA 07), TYCOM, ISIC and SUBMEPP indicating:

(1) Applicable DSS HIP.

(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.

38.2.8 Operating Cycle/Interval Extensions. An Audit Plan to assess the material condition of vehicles prior to extending their operating cycle/intervals beyond DSS HIP periodicities due to changing availability dates or operational schedules, is required.

38.3 RESPONSIBILITIES.

38.3.1 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 and Part III, Chapter 8 of this manual.

38.3.2 Submarine Maintenance Engineering, Planning and Procurement Activity.

a. Receive reports of completion of DSS HIPs 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 38.2.3.1 of this chapter.

d. Revise the periodicity and next due dates in DSS HIP inventories and schedules to reflect any NAVSEA approved periodicity change, or TYCOM approved periodicity extensions as allowed for in the individual DSS HIP.

e. Notify the TYCOM via the on-site SUBMEPP Representative of any DSS HIP beyond periodicity for TYCOM resolution.

f. Provide updated DSS HIP inventories and schedules CD in accordance with the distribution.

g. Provide, as enclosures to the quarterly inventories and schedules forwarding letter, a list of DSS HIPs that appear overdue in the schedules and a list of DSS HIPs that have been reported complete by the fleet but Objective Quality Evidence has not been received by SUBMEPP.

h. Receive and review DSS HIP Objective Quality Evidence for technical accuracy and maintain DSS HIP completion history.

38.3.3 Immediate Superior In Command.

a. Maintain auditable records of DSS HIP accomplishment for each DSS. These records will include the current SUBMEPP Quarterly inventories and schedules, completed AWRs for DSS HIPs completed, data report forms/reports submitted as a result of last accomplishment and all approved DFSs.

b. Conduct periodic audits of assigned FMAs and Sustaining Activities to verify full compliance with the provisions of reference (a), Volume V, Part I, Chapter 9 and Part III, Chapter 9 of this manual and this chapter.

c. In addition to the records of audits, maintain a file, by DSS, of the current DSS HIP inventories and schedules as provided by SUBMEPP. The schedules (Appendix B of this chapter) for each DSS 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 DSS HIPs must rest with the DSS Commanding Officer, the nature and scope of the DSS HIPs dictate that the ISIC coordinate the accomplishment of DSS HIPs in accordance with the SUBMEPP provided PMR inventories and schedules. Accordingly, the ISIC shall assist in the preparation of, and approve each DSS HIP 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 vehicle's quarterly DSS HIP inventory and schedule against the schedule information on the individual DSS HIP to verify DSS HIP 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 DSS HIP changes, audit the individual DSS HIP procedural and schedule information against each DSS'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 DSS HIPs listed. Forward copies of completed Data Report Forms for these and any other DSS HIP completions identified by SUBMEPP as having missing Data Report Forms.

e. Ensure that all DSS HIP requirements with the appropriate screening (Ship's Force, FMA) are in the CSMP for subsequent development by SUBMEPP of forthcoming availability AWPs.

f. In the event that deviations from required periodicities or full requirements of the DSS HIPs 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 DSS HIP program deviations. DFS requests are also to be submitted when repairs arising from the DSS HIP inspections cannot be completely accomplished. Periodicity extension requests for all DSS HIPs shall be submitted in accordance with paragraph 38.2.4 of this chapter.

g. Establish procedures to affect routing of completed AWRs from the FMA ARRS or from the Sustaining Activity (LWC 991) through the ISIC for all DSS HIP 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 DSS HIP 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 DSS HIP 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, Part I, 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 and Part III, Chapter 8 of this manual. Ensure SUBMEPP inventories and schedules are updated in accordance with paragraph 38.3.3.c of this chapter. Clear DSS HIP 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 DSS HIP as stated in the approved DFS.

h. Upon identifying a material condition that would result in a reduced inspection periodicity, ensure the accomplishing activity immediately reports the condition found via official correspondence to NAVSEA (PMS 399), the TYCOM and SUBMEPP in accordance with paragraph 38.2.7.c of this chapter.

i. Monitor the timely submission of DSS HIP data report forms and the report of accomplishment for DSS HIPs completed by the FMA and Ship's Force to ensure required documentation is submitted in accordance with paragraph 38.2.7 of this chapter. Ensure data report forms are submitted to report component replacement/repair/operation out of specification. Review all Sustaining Activity accomplished DSS HIP data for compliance with the requirements of the DSS HIP Program prior to submittal to SUBMEPP.

j. Prior to a DSS's underway period, review the vehicle's certification continuity report, if submitted, to ensure the ISIC and DSS's records (including the CSMP) accurately reflect DSS HIP status.

k. The Parent ISIC of deploying ships will:

(1) Ensure that any DSS HIP due for accomplishment by the ship/DSS during its deployment period is identified in the CSMP transfer file and that the ship possesses the AWRs and DSS HIP data report forms (if applicable) for reporting job completion.

NOTE: THIS IN NO WAY RELIEVES THE PARENT ISIC OF THE RESPONSIBILITY TO ENSURE THAT THE REQUIRED DSS HIPs ARE ACCOMPLISHED WITHIN THE SPECIFIED PERIODICITIES.

(2) Provide a message to the applicable deployed FMA/Squadron identifying any DSS HIP expected to be accomplished by the deployed FMA and the status of required materials for each DSS deploying to cover the period of the deployment.

l. Deployed Squadrons will review the DSS HIP status of deployed DSSs upon in-chop. Perform the function of the Parent ISIC in ensuring all DSS HIPs are accomplished and reported within the required periodicity while the DSS is deployed.

m. Prior to the start of an availability, ISIC DSS HIP coordinators will:

(1) Assign Job Control Numbers to DSS HIP items assigned to Forces Afloat in the AWP and screen them prior to the start of the availability in accordance with the directions in the AWP. Care must be taken to appropriately assign DSS HIP items to the correct accomplishing activity.

(2) ISIC DSS HIP coordinators will not assign Job Control Numbers to DSS HIP items assigned to the industrial activity in the AWP. In the DSS HIP inventories and schedules, in the remarks/completion information area, enter "assigned to (name of industrial activity) by AWP (name and number of availability)". The industrial activity is responsible for performing, auditing and reporting all DSS HIP items assigned by the AWP.

(3) DSS HIPs 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 industrial activity via a supplemental work request.

n. DSS HIPs assigned to the industrial activity by the AWP which are not accomplished during the depot period will be reassigned to another availability by the TYCOM following the depot period provided the DSS HIP 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.

o. Prior to availability completion, ISICs will audit DSS HIPs 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 DSS HIP items coming due within six months of availability completion are complete or assigned to a follow-on fleet availability. Under no circumstances are DSS HIP due dates to be exceeded. ISIC Quality Assurance Officers will not be responsible for auditing DSS HIPs assigned to the depot in the AWP.

p. Following availability completion, the ISIC DSS HIP coordinator will ensure that all DSS HIPs assigned to the industrial activity were reported and subsequently updated by SUBMEPP. ISICs will only upline the closed Job Control Numbers for DSS HIPs completed by Forces Afloat.

38.3.4 Deep Submergence System Commanding Officer.

a. Ensure all DSS HIPs are accomplished within the required periodicity as specified by SUBMEPP.

b. Maintain auditable records of the accomplishment of DSS HIPs to permit verification of compliance with reference (a), Volume V, Part I, Chapter 10 and Part III, Chapter 10 of this manual and this chapter. These records shall consist of:

(1) Copies of letter of completion for all DSS HIP work accomplishment by other activities.

(2) 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 DSS HIPs. A copy of each completed report shall be submitted to the ISIC for review a minimum of 24 hours prior to manned operations.

(3) One copy each of the current Quarterly DSS HIP inventories and schedules as printed from the CD provided by SUBMEPP. Annotate the DSS HIP Inventory Report when accepting completed work requests from the FMA or Ship's Force (LWC 991). It is the DSS responsibility for ensuring that the reports reflect the actual configuration, especially with regards to the equipment identity and the Allowance Parts List.

(4) Copy of outstanding DSS HIP AWRs to be accomplished by Ship's Force.

(5) One copy of each approved DFS from the requirements of reference (a), Volume V, Part I, Chapter 8 and Part III, Chapter 8 of this manual and this chapter. This authority is based on the following factors and considerations:

(a) The completion of all DSS HIPs, or portions thereof, will be reported on AWRs provided by the ISIC in accordance with paragraph 38.2.5.3 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 DSS HIP.

(b) Deviations from DSS HIP 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 DSS HIP maintenance actions unless formal NAVSEA approval of such deviations has been granted by an approved DFS or as allowed in paragraph 38.2.4 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 manned operations if all required DSS HIP 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 manned operations are contingent upon the satisfactory completion of these maintenance actions.

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APPENDIX A

SUBMEPP DSS HIP INVENTORY

FOR OFFICIAL USE ONLY

PERIODIC MAINTENANCE REQUIREMENTS — REPORT DATE: 01 Nov 2005

HIP CHANGE: 39 Sep 2005 — INVENTORY URO/HIP SORTED BY URO/HIP

DRY DECK SHELTER 03P DDS 03P — SDVT-2

SHIP'S UIC: 59603

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO / MJFCN	PROC TYPE	MID NO	MRN	RML	DD	LAST WRK CTR JSN / URO ITEM	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 1310 PRESSURE HULL																
ITEM-01			PENDING	HIP	001					X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP01	XCONFIGITEM						D									
ITEM-02			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP02	XCONFIGITEM															
ITEM-03			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP03	XCONFIGITEM															
ITEM-04			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP04	XCONFIGITEM															
ITEM-05			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP05	XCONFIGITEM															
ITEM-06			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP06	XCONFIGITEM															
ITEM-07			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP07	XCONFIGITEM															
ITEM-08			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP08	XCONFIGITEM															
ITEM-09			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP09	XCONFIGITEM															
ITEM-10			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP10	XCONFIGITEM															
ITEM-11			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP11	XCONFIGITEM															

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO / MJFCN	PROC TYPE	MID NO	MRN	RML	DD	LAST WRK CTR JSN / URO ITEM	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 1310 PRESSURE HULL (Cont'd)																
ITEM-12			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP12	XCONFIGITEM															
ITEM-13			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP13	XCONFIGITEM															
ITEM-14			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP14	XCONFIGITEM															
ITEM-15			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP15	XCONFIGITEM															
ITEM-16			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP16	XCONFIGITEM															
ITEM-17			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP17	XCONFIGITEM															
ITEM-18			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP18	XCONFIGITEM															
ITEM-19			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP19	XCONFIGITEM															
ITEM-20			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP20	XCONFIGITEM															
ITEM-21			PENDING	HIP	001		D			X	Dec 2002	Dec 2009	84M		1310 270137 L901	
596003AP21	XCONFIGITEM															

PERIODIC MAINTENANCE REQUIREMENTS — REPORT DATE: 01 Nov 2005

HIP CHANGE: 39 Sep 2005 — INVENTORY URO/HIP SORTED BY URO/HIP

DRY DECK SHELTER 03P DDS 03P — SDVT-2

SHIP'S UIC: 59603

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO / MJFCN	PROC TYPE	MID NO	MRN	RMLL	DD	LAST WRK CTR JSN / URO ITEM	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 1110 SUPERSTRUCTURE AND FAIRWATER																
AFTSUPSTRUCT			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1110 270900 L902	
596003AM02	XCONFIGITEM															
FWD MOUNT RG			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1110 270900 L902	
596003AM04	XCONFIGITEM															
ATTSTUDS&WLD			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1110 270900 L902	
596003AM06	XCONFIGITEM															
FRG MEM&WLD			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1110 270900 L902	
596003AM10	XCONFIGITEM															
EXT FOUND			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1110 270900 L902	
596003AM12	XCONFIGITEM															
SYSTEM: 1310 PRESSURE HULL																
HANGAR CYL			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AG02	XCONFIGITEM															
ACC SPHERE			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AG04	XCONFIGITEM															
ACC SPH SKRT			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AG06	XCONFIGITEM															
HYPER CHAMBR			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AG08	XCONFIGITEM															
FR FLANGES			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AJ02	XCONFIGITEM															

DRY DECK SHELTER 03P DDS 03P SDVT-2

SHIP'S UIC. 59603

COMPID	LINE ITEM	COMP SERIAL	MJC NO	PROC TYPE	MID NO	MRN	RML	DD	LAST WRK CTR JSN	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
HSC	RIC		MJFCN						URO ITEM							
SYSTEM: 1310 PRESSURE HULL (Cont'd)																
FR WEBS			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AJ04	XCONFIGITEM															
ATT RNGS&WLD			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AM08	XCONFIGITEM															
INS&PEN EXT			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AM16	XCONFIGITEM															
INS&PEN INT			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1310 270163 L902	
596003AS04	XCONFIGITEM															
SYSTEM: 1700 WATERTIGHT HATCHES (PRESSURE HULL), TRUNKS AND ENCLOSURES																
EXT HNG DOOR			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1700 270480 L902	
596003BG08	312110266Y															
SYSTEM: 1770 INTERNAL STRUCTURAL BULKHEADS																
HYP CHMBR DR			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1770 270540 L902	
596003BG04	312110258Y															
INR HNG DOOR			PENDING	HIP	002		D			X	Jan 2003	Jan 2007	48M		1770 270540 L902	
596003BG06	312110258Y															

PERIODIC MAINTENANCE REQUIREMENTS
INVENTORY URO/HIP SORTED BY URO/HIP

HIP CHANGE: 39 Sep 2005

REPORT DATE: 01 Nov 2005

DRY DECK SHELTER 03P DDS 03P

SDVT-2

SHIP'S UIC: 59603

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO / MJFCN	PROC TYPE	MID NO	MRN	RML	DD	LAST WRK CTR JSN / URO ITEM	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 5081 FLOOD, VENT & DRAIN																
SHD-001			PENDING	HIP	003		I			X	Dec 2002	Dec 2009	84M/R		5081 444340 L903	
5960D3MU10	887306276Y										R=F16Accomplish whenever the valve is removed for other reasons.					
SHF-001			PENDING	HIP	003		I			X	Dec 2002	Dec 2009	84M/R		5081 440015 L903	
596003MV10	887305590Y										R=F16Accomplish whenever the valve is removed for other reasons.					
SHF-002			PENDING	HIP	003		I			X	Dec 2002	Dec 2009	84M/R		5081 440015 L903	
596003MV20	887306272Y										R=F16Accomplish whenever the valve is removed for other reasons.					
SHA-029			PENDING	HIP	003		I				Dec 2002	Dec 2009	84M/R		5081 440015 L903	
596003PU29	887306275Y										R=F16Accomplish whenever the valve is removed for other reasons.					

PERIODIC MAINTENANCE REQUIREMENTS REPORT DATE: 01 Nov 2005

HIP CHANGE: 39 Sep 2005 INVENTORY URO/HIP SORTED BY URO/HIP

DRY DECK SHELTER 03P DDS 03P SDVT-2

SHIP'S UIC: 59603

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO / MJFCN	PROC TYPE	MID NO	MRN	RML	DD	LAST WRK CTR JSN / URO ITEM	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 0611 AUDITS AND CERTIFICATION																
VITAL EQUIP			PENDING	HIP	004		0				May 2002	May 2006	48M/R		0611 603040 L904	
596003AD02	XCONFIGITEM										R=N97 Accomplish after each ROH, or after installation or other configuration change which adds equipment or significantly changes existing design.					

PERIODIC MAINTENANCE REQUIREMENTS

01 Nov 2005

HIP CHANGE: 39 Sep 2005

INVENTORY URO/HIP SORTED BY URO/HIP

DRY DECK SHELTER 03P DDS 03P

SDVT-2

SHIP'S UIC: 59603

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO / MJFCN	PROC TYPE	MID NO	MRN	RML	DD	LAST WRK CTR JSN / URO ITEM	MCC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 5081 FLOOD, VENT & DRAIN																
SHF-001			PENDING	HIP	005		D			A	Dec 2002	Dec 2009	84M		5081 440015 L905	
596003MV10	887305590Y															
SHF-002			PENDING	HIP	005		D			A	Dec 2002	Dec 2009	84M		5081 440015 L905	
596003MV20	887306272Y															

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APPENDIX B

SUBMEPP DSS HIP SCHEDULE

FOR OFFICIAL USE ONLY

PERIODIC MAINTENANCE REQUIREMENTS
SCHEDULED URO/HIP

HIP CHANGE: 39 Sep 2005

REPORT DATE: 01 Nov 2005
CUTOFF DATE: 01 Aug 2006

DRY DECK SHELTER 03P DDS 03P

SDVT-2

SHIP'S UIC: 59603

COMPID / HSC	LINE ITEM / RIC	COMP SERIAL	MJC NO / MJFC	PROC TYPE	MID NO	MRN	RML	DD	LAST WRK CTR JSN / URO ITEM	MC	LMA DATE	DUE DATE	PER	ALT	REMARKS/COMPLETION INFO JSN	DATE
SYSTEM: 0611 AUDITS AND CERTIFICATION																
VITAL EQUIP			PENDING	HIP	004		0				May 2002	May 2006	48M/R		0611 803040 L904	
596003AD02	XCONFIGITEM										R=N97Accomplish after each ROH, or after installation or other configuration change which adds equipment or significantly changes existing design.					

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APPENDIX C

REQUEST FOR DSS HIP PERIODICITY EXTENSION FORMAT

4790
Ser

From: Commander, DSS Squadron ___
To: Commanding Officer, Submarine Maintenance Engineering, Planning and Procurement (SUBMEPP) Activity
Via: COMNAVSPECWARCOM

Subj: REQUEST FOR EXTENSION OF PERIODICITY FOR DSS HIP (S)_____ON DSS Vehicle/Shelter and Hull No.)

Ref: (a) Applicable DSS HIP
(b) COMUSFLTFORCOMINST 4790.3; Joint Fleet Maintenance Manual, Volume VI, Chapter 38
(c) COMNAVSPECWARCOM ltr 4790 Ser __of (previous letter granting extension of periodicity)

1. In accordance with references (a) and (b), request extension of DSS HIP periodicity for Deep Submergence System (Vehicle/Shelter and Hull No.) as follows:

DSS HIP	Equipment Guide List Item Number or Component Ident	LMA Date	Current Due Date	Inactive Time		Extension Required	Required Next Due Date
					Inactive Days		
001	All	June 82	Apr 91		100 days	7 months	Nov 91
002	All	June 82	Aug 91		100 days	3 months	Nov 91
003	All	June 82	Aug 91		100 days	3 months	Nov 91
004	All	June 84	Apr 91		100 days	7 months	Nov 91
005	VB-10	June 84	Apr 91		100 days	7 months	Nov 91

2. Inactive time identified for the DSS HIPs listed in paragraph 1 above is the actual allowable time accrued to date since DSS HIP was last accomplished/previous extension of periodicity was granted by reference (c).

Copy to:
COMNAVSEASYSCOM (PMS 399)
Commanding Officer, _____

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VOLUME VI

CHAPTER 39

LESSONS LEARNED PROCESS BUSINESS RULES

FOR SURFACE FORCE SHIPS

LISTING OF APPENDICES.

A Access to Lessons Learned Conference Website on SURFOR Web

39.1 PURPOSE.

a. The primary purpose of the Lessons Learned Conference (LLC) is to facilitate communication between Project Teams of all Surface Force ship classes across all Regional Maintenance Centers (RMC) and supporting activities at various stages in their availability to assist in improving cost, schedule and performance. The LLCs provide a singled-up approach to evaluate and capture critical lessons learned and barriers brought forward by Project Teams to facilitate process improvements in the Surface Navy.

b. The LLC process encompasses the established milestones and/or meetings within the planning and execution of availabilities in accordance with Volume II, Part II, Chapter 2 of this manual. Appendix D of Volume II, Part II, Chapter 2 of this manual includes a detailed table of milestones. Meetings that already exist to reinforce process improvements may include the Advance Planning Meeting, Work Package Integration Conference, Work Package Execution Review, Arrival Conference, 50% Conference and Completion Conference. While these events occur at various times, the feedback process exists to continually collect information to improve processes.

39.2 LESSONS LEARNED CONFERENCE OVERVIEW.

39.2.1 Lessons Learned Conference Concept. The LLC is not a program review, an evaluation of the Maintenance Team (government or contractor) or a forum to acknowledge heroism or place blame. It is a process review, an evaluation of the execution of the availability from the advance planning to the completion of the availability. It is also a place to identify process issues that can further improve overall end to end maintenance and modernization process.

39.2.2 Lessons Learned Conference Objective. The objective of the LLC is to identify process improvements as they pertain to scheduled availabilities. Feedback will be shared locally and globally in the surface force ship community and will ultimately be embedded into the maintenance and modernization processes.

39.2.3 Lessons Learned Conference Key Membership.

a. Process Owner. Commander, Naval Surface Forces Atlantic N43 and Commander, Naval Surface Forces Pacific N43 are the overall LLC process owners. As such, Commander, Naval Surface Forces Atlantic N43 and Commander, Naval Surface Forces Pacific N43 are responsible for the general management of implementing the LLC process to ensure process effectiveness. While the Type Commanders (TYCOM) are the LLC Process Owners, the LLCs are part of the Surface Team One (ST1) structure as a “Knowledge Sharing Network”. Each Knowledge Sharing Network under ST1 is assigned a Process Master; the LLC Process Master will be identified by the Process Owners.

b. The RMC LLC Analysis Team Member. Each RMC must have a designated LLC Analysis Team Coordinator and a designated LLC Analysis Team Waterfront Operations Representative on the Analysis Team. Some RMCs may choose to have the Coordinator and Waterfront Operations Representative to be one and the same due to the time requirements demanded of an Analysis Team Member.

(1) The LLC Analysis Team Coordinator is responsible for the coordination and facilitation of their local RMC’s scheduled LLCs. This person serves as the liaison between the Project Teams and the global LLC Community. Further guidance regarding the RMC LLC Coordinator’s responsibilities are outlined in the LLC Analysis Team Business Rules.

(2) The LLC Analysis Team RMC Waterfront Operations Representative is responsible for providing the Waterfront expertise and knowledge for their local RMC to the Analysis Team. This person serves as the liaison between his or her RMC's waterfront and the global LLC Community. Further guidance for the roles and responsibilities of the local RMC LLC Analysis Team Member in completing the LLC Availability Overview Presentation is contained in the LLC Analysis Team Business Rules.

NOTE: WHILE THE LLC ANALYSIS TEAM MEMBER POSSESSES MANY RESPONSIBILITIES AS THE LLC MEETING FACILITATOR, HE OR SHE SHOULD EXPECT TO RECEIVE ASSISTANCE FROM ALL STAKEHOLDERS.

c. RMC Class Team Leader (CTL). The RMC CTLs are responsible for attending each of their respective class of ships LLC regardless if their RMC is scheduled to brief during the meeting. By attending all LLCs, they will be able to assist the Analysis Team in knowledge and lessons learned transfer between their Ship Class LLC and the Project Teams internal to his or her RMC.

d. RMC Availability Project Manager (PM). The RMC PM is responsible for preparing and briefing their ship's Chief of Naval Operations (CNO) Availability LLC Overview Presentation. The RMC PM will capture all lessons learned, action items and barriers deemed necessary to be communicated to the Surface Maintenance and Modernization Community.

e. Maintenance Community. Other maintenance activities involved with ship availabilities (in addition to those highlighted in preceding paragraphs) will participate in the LLC. These representatives are active members of the LLC Community and are responsible for maintaining awareness of ship class issues and participating in the individual ship LLCs. The following participants are mandatory:

(1) TYCOM N43 Type Desk Office.

(2) TYCOM Project Engineer.

(3) Immediate Superior In Command.

(4) Ship's Force Representative.

(5) Multi-Ship/Multi-Option/Firm Fixed Price Contractor.

(6) Surface Maintenance Engineering Planning Program Activity (SURFMEPP) Detachment Representative.

f. Modernization Community. Representatives of any Alteration Installation Team or other non-repair activity involved with availabilities will participate in the availability LLC meetings as appropriate:

(1) Naval Sea Systems Command (NAVSEA) 21.

(2) Field Activities.

(3) Space and Naval Warfare Systems Command.

(4) Program Manager Representative.

(5) Planning Yard Representative.

39.3 PREPARING FOR THE LESSONS LEARNED CONFERENCE.

39.3.1 Preparation. To adequately prepare for an LLC, Project Teams should track any lessons learned and barriers that they feel will be beneficial to other Project Teams throughout their Planning and Execution phases. All Project Teams will be first introduced to the LLC Process during their first scheduled Integrated Project Team Development Event at A-360 by their local RMC LLC Analysis Team Coordinator/Waterfront Operations Representative.

39.3.2 Lessons Learned Conference Presentation Overview. The LLC Availability Overview Presentation serves as the format for the Project Teams to articulate key lessons learned and barriers encountered during their Availability Cycle. The LLC Availability Overview Presentation template is available through the RMC Analysis Team Member. Throughout the planning stages and execution of the availability, Maintenance Team members, including the RMC, Ship's Force, contractor, Alteration Installation Teams and other key availability stakeholders shall assist the RMC PM in submission of the LLC presentation. Input should also be gathered from:

a. Ship's Commanding Officer's Weekly Situation Reports.

b. Standard metrics identifying top cost drivers.

c. Late add alteration risk assessment messages (including comparison of expected versus actual impact to the availability).

d. Late add alteration risk acceptance.

e. Waivers for work added after A-180 day milestone (including impact to availability).

f. Cost variance forms provided by contractor.

g. A review of contract changes to the base work package.

39.4 CONDUCTING A LESSONS LEARNED CONFERENCE.

39.4.1 Lessons Learned Conference Schedule. LLCs are scheduled for each ship class to take place via Video Teleconference once every quarter. Required LLC Project Teams are determined based on their Start of Availability and End of Availability dates. A schedule of all LLCs is available on the LLC website.

39.4.2 Agenda. The primary focus of the meeting is to discuss lessons learned, best practices and barriers pertaining to the selected CNO Availability. An agenda for all scheduled LLCs will be forwarded to all participants by the ST1 LLC Process Master, RMC LLC Analysis Team Coordinator or CTL. The agenda will also be available on the LLC website (https://www.surfor.navy.mil/sites/st1/llc).

39.4.3 Lessons Learned Conference Focus Areas. Surface Force Ships are required to participate in LLCs at various times during a ship's scheduled CNO Availability Cycle from A-390 to C+30. The LLCs serve as a venue for Project Teams to discuss the behaviors and practices that affected the Availability along with reporting of the results of those availabilities to the Maintenance and Modernization community. The purpose and phases of LLC are as follows:

a. Advanced Planning Session occurs between A-390 to A-360.

(1) Discussion on any lessons learned or barriers associated with the Advanced planning time frame from A-540 to A-241.

(2) Initiate Project Team Member communications.

(3) Identify significant risks to Availability Planning.

b. Planning Lessons Learned session occurs between A-120 to A-80.

(1) Discussion on any lessons learned or barriers associated with the Pre-planning time frame from A-240 to A-61.

(2) Discuss risks and established risk mitigation plans.

(3) Share lessons learned/barriers of the planning process.

c. Execution Lessons Learned session occurs between C-15 to C+30. Discuss any lessons learned or barriers affecting the Availability associated with the time frame from A-540 to C+60.

39.4.4 Invitees. Key membership and project team personnel involved with the availability will be notified of the LLC meeting by the ST1 LLC Process Master, the RMC LLC Analysis Team Coordinator or the CTL. Key stakeholders involved with future availabilities will also be invited to attend the meeting.

39.4.5 Invites and Announcement. The RMC LLC Analysis Team Coordinator will review the scheduled LLCs on no less than a monthly basis. The schedule will include a list of hulls that are scheduled to present at an LLC, to include the phase of their availability they will be presenting. The process and timeline for LLC notification is outlined in the LLC Analysis Team Communications Plan.

39.4.6 Lessons Learned Conference Documents. All LLC documentation will be in accordance with the LLC Analysis Team Communications Plan.

39.4.7 Lessons Learned Conference Minutes. All participants, action items and barriers will be documented in minutes following each LLC. The minutes will be forwarded no later than three business days to all invitees, ST1 Executive Steering Committee (ESC) and RMC Commanders. The minutes will also be posted on the LLC site on the Surface Force (SURFOR) Web.

39.4.8 Lessons Learned Conference Website. LLC process meeting documents and information shall be posted on the SURFOR LLC website. This site tracks all scheduled LLCs throughout the calendar year, all meeting preparation materials to include necessary read-ahead material for participants, Project Team Point of Contact Lists and meeting minutes. The website should be used to aid in planning work packages and preparing for availabilities to ensure that any barriers and lessons learned identified by previous LLC Project Teams are applied to future availabilities. The website is located at https://www.surfor.navy.mil/sites/st1/llc. See Appendix A for instructions on obtaining access.

39.5 INTERACTION AMONG FEEDBACK PROCESSES.

39.5.1 Relationships. The LLC meeting is sensitive to the contractor-government relationship and the legal procedures that accompany it. The Department of the Navy Acquisition Reform strategy includes a goal to "build a continuous dialogue with industry to identify mutually beneficial opportunities and practices". While the Department of the Navy encourages open communication between the contractor and the government, many legal issues arise from such information sharing. It is critical that the LLC meetings and general processes maintain awareness of the following legal procedures: Federal Advisory Committee Act, Procurement Integrity Act, Trade Secrets Act and Organizational Conflicts of Interest. Additionally, the LLC process is mindful of other feedback/review processes, such as the Award Fee Board and Contractor Performance Assessment Report.

39.5.2 Consistency. These business rules recognize the need for consistency between other feedback processes and the need for all to exist. As the LLCs will most likely occur prior to the Award Fee Board and the Contractor Performance Assessment Reports issuance, sensitive issues may arise. The LLCs intend to remain focused on process improvement, lessons learned and barrier identification. The LLC will allow for sensitive issues to remain in closed sessions or within the scope of their existing feedback and review processes.

39.6 LESSONS LEARNED CONFERENCE APPLICATION AND KNOWLEDGE SHARING.

39.6.1 Communication of Lessons Learned, Barriers and Action Items. Lessons Learned, Barriers and Action Items and their associated resolutions are only useful when they are communicated between maintenance and modernization professionals. The following are the required methods for sharing information in a timely manner, but are not the only means to share this information:

a. Maintenance and Modernization Performance Review. Status of LLC Action Items and Barriers will be provided during each Maintenance and Modernization Performance Review.

b. Surface Team One Executive Steering Committee Meetings. When requested, the LLC Process Master will brief the ST1 ESC. As a minimum, each ESC meeting will include a status brief of all open action items and barriers. When barriers are briefed to the ESC, the barrier will be assigned to the correct point of contact for action and closure.

c Surface Team One Monthly Process Master Meetings. Monthly meetings will be conducted with each Surface Ship Readiness Initiative Process Master or designated support personal. These meetings will serve as a venue to provide a critical review of assigned action items from each LLC.

APPENDIX A

ACCESS TO LESSONS LEARNED CONFERENCE WEBSITE ON SURFOR WEB

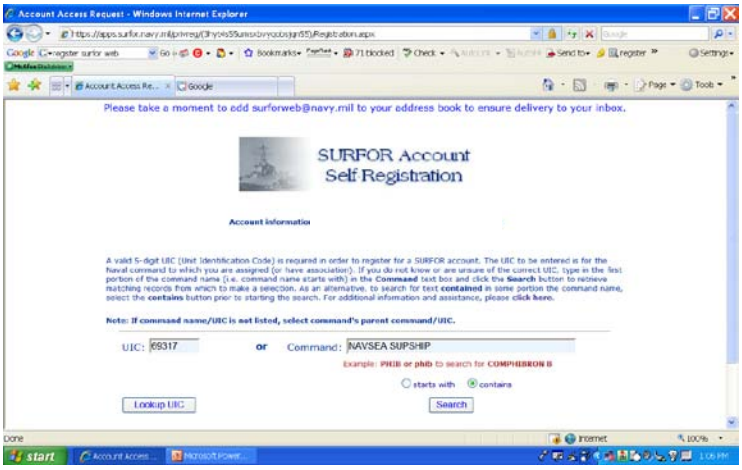
1. Go to: http://www.register.surfor.navy.mil/default.aspx.
2. Click on: "Register for 'SURFOR Web' Account".
3. Fill in the information requested and submit.

***NMCI Users**: You are finished! You will soon receive an email with a username/password. The first time you log in to the site, you will need to use it. Thereafter, the website will refer to your CAC and you will not need to enter any information.*

Once you have an account, go to: https://www.surfor.navy.mil/sites/st1/llc

FOR NON-NMCI USERS

4. Follow steps 1-3 above. You will then be directed to the below screen.
    a. In the Command field, type in "NAVSEA".
    b. Select "contains" under the command field.
    c. Click "Search". This should bring up a drop down menu from which you can choose the most appropriate command.
    d. Once you select a command, click on "Lookup UIC".
    e. Click "Submit" at the bottom of the screen.
5. You will be directed to another page requesting additional information. When prompted, enter "Katherine Buckley" or "Inga Parvani" as your Point of Contact.
6. If you require further assistance, email surforweb@navy.mil.



You are finished! You will soon receive an email with a username/password.

Once you have a SURFOR Web account, go to: https://www.surfor.navy.mil/sites/st1/llc

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VOLUME VI

CHAPTER 40

SUBMARINE MESSAGE REPORTING

REFERENCES.

(a) SECNAVINST 5510.36 - Department of the Navy Information Security Program Regulation, Chapter 6
(b) NAVSEAINST 4720.14 - Temporary Alterations to Active Fleet Submarines, Control of
(c) NAVSEA SL720-AA-MAN-010 - Fleet Modernization Program Management and Operations Manual

LISTING OF APPENDICES.

A Sample (SUBS) Initial Message
B Sample (SUBS) Update Message
C Sample (SUBS) Final/Closeout Message
D Sample (SUBS) Shipalt/Tempalt Installation Message
E Sample (SUBS) Shipalt/Tempalt Removal Message

40.1 PURPOSE. This chapter provides policy and guidance regarding the utilization of (SUBS) messages. Reactor Plant and Strategic Weapons Systems material issues are not governed by this document and shall not to be reported via (SUBS) message format. (SUBS) message requirements for New Construction, Chief of Naval Operations, (CNO) and Type Commander (TYCOM) depot availabilities are addressed in Volume II, Part I, Chapters 3 and 4 of this manual and will not be addressed in this chapter. This chapter supercedes all other policy, procedures or guidance previously promulgated regarding (SUBS) messages.

40.2 BACKGROUND. Submarine material and equipment problems or requests for technical assistance reported via message have experienced delays receiving the required resolutions for identified problems. Delays were associated with insufficient data and or improper message addressing.

40.3 SCOPE. To establish protocol for the reporting of submarine equipment, systems and material issues that affect ship's mission or ship/personnel safety. To establish a reporting procedure that will ensure all necessary commands and technical authorities are contacted without delay. To ensure the correct action is identified and provided to the ship using the most rapid means.

40.4 POLICY.

a. The parenthetical code word (SUBS) shall appear as the first word in the subject line before the subject description.

b. (SUBS) messages shall identify its status by using the words INITIAL, UPDATE or FINAL at the end of the subject line.

c. The (SUBS) message shall not be used as a substitute for any Casualty Report, Situation Report or Incident Report that may be required by higher authority. A (SUBS) message shall be sent to provide further supplemental information needed to explain the problem, provide troubleshooting support and identify its effect on the ship.

d. (SUBS) messages are intended for material and technical assistance request issues pertaining to ship's mission or personnel safety and should not be used to report routine administrative items such as visit requests, post tech assist visit reports or any other event not requiring the urgency of a (SUBS) message.

e. (SUBS) messages originated by submarines will be updated by the submarine at a periodicity not greater than once every 30 days. UPDATES should include equipment status, repair efforts in progress and if known anticipated repair date.

f. To identify (SUBS) message priority use the following precedence:

(1) ROUTINE - REQUEST ANSWER WITHIN 5 WORKING DAYS.

(2) PRIORITY - REQUEST ANSWER WITHIN 3 WORKING DAYS.

(3) IMMEDIATE - REQUEST ANSWER WITHIN 24 HOURS.

g. (SUBS) messages shall be used to identify the installation and removal of Temporary Alterations (TEMPALT) and Ship Alterations (SHIPALT). However the 30-day UPDATE requirement and precedence identification is waived for these instances.

h. (SUBS) messages identifying the installation or removal of a TEMPALT or SHIPALT will identify such message by placing the words (TEMPALT) or (SHIPALT) at the end of the subject line.

i. (SUBS) messages are to be classified appropriately in accordance with reference (a).

j. (SUBS) messages shall be addressed to the controlling Immediate Superior In Command (ISIC) for action and INFO Naval Sea Systems Command (NAVSEA), NAVSEA 08, TYCOMs and Technical Authority as appropriate ensuring parent commands are included as addressees.

k. A FINAL close out (SUBS) message shall be sent upon correction of the reported material problem or if in the Commanding Officer's judgement a technical resolution has been reached and all required repairs have been firmly scheduled.

l. NAVSEA shall review all (SUBS) messages and provide responses to the ISIC within the precedence time line as identified in paragraph 40.4 f. of this chapter.

m. (SUBS) messages initiated by NAVSEA requesting information from one or more Commands shall be tracked by NAVSEA.

n. (SUBS) messages being initiated for the purpose of gathering technical information from submarines shall be provided to the TYCOM for action.

o. Technical Authorities shall provide all (SUBS) message responses to NAVSEA, TYCOM and ISIC for review and action.

p. (SUBS) messages shall not be initiated by a Technical Authority unless authorized by NAVSEA, TYCOM or ISIC.

40.5 RESPONSIBILITIES.

40.5.1 Type Commanders.

a. Review (SUBS) message traffic and when necessary readdress or forward to ensure the proper Technical Authority was identified and aware of the message.

b. Assist and support the ISIC as required to generate (SUBS) messages.

c. (SUBS) messages initiated by the TYCOM, requesting information from one or more Commands are to be tracked by the TYCOM department generating the message.

d. Track all (SUBS) messages generated by submarines under its cognizance.

40.5.2 Immediate Superior In Command.

a. Review and take for action all (SUBS) messages coordinating with NAVSEA, TYCOM and the Technical Authority to generate and provide message responses as required and within the precedence time line as identified in paragraph 40.4 f. of this chapter.

b. (SUBS) messages sent to or initiated by a submarine under its cognizance shall be tracked by the ISIC.

c. (SUBS) messages initiated by the ISIC requesting information from one or more commands shall be tracked by the ISIC.

40.5.3 Ship's Commanding Officer.

a. (SUBS) messages initiated by the ship shall be tracked by the ship until closeout.

b. Responses to technical assistance (SUBS) messages shall be answered as soon as the troubleshooting efforts have results. If requested troubleshooting efforts are not accomplished due to ship's operations or lack of test equipment, generate a (SUBS) message containing efforts taken, results, effect on ship and any further assistance needed.

c. When requesting onboard technical assistance, Chapter 2 of this volume, Fleet Technical Assistance, shall be used as guidance.

d. Issue a (SUBS) message to identify the installation and removal of TEMPALTs and SHIPALTs.

40.6 MESSAGE REQUIREMENTS.

a. All (SUBS) messages requesting technical assistance will contain, as a minimum, the following requirements:

(1) EXECUTIVE SUMMARY - faulted equipment, when the fault occurred, functions lost and equipment effected.

(2) BACKGROUND (if any) - previous related equipment problems, when experienced, corrective action taken, last completed system certification.

(3) DESCRIPTION OF THE PROBLEM - affected equipment, type of fault, fault indications, system indications.

(4) TROUBLESHOOTING EFFORTS - procedures used, documentation held onboard, Ship's Force training and experience with the equipment, troubleshooting limitations, special equipment held, any possible fault identified during Ship's Force troubleshooting.

(5) ASSISTANCE DESIRED - repair parts needed, distance support or onboard technical assistance needed, if known identify the technical authority and the next available ship operation where a technician could board the ship. Identify the problem as corrected, no further assistance required and justify it as a FINAL REPORT with no additional action required. When answering an information request (SUBS) message a closeout message is not required and should be identified as such in Paragraph 5 of the message. (i.e., no additional action required by this message)

(6) COMMANDING OFFICER'S ASSESSMENT - level of impact assessment of ship's capabilities to complete operational commitments, any additional backup or redundant systems and its operational status.

(7) REQUIRED RESPONSE DATE - Specify the calendar date response is due by to support ship operations.

b. All (SUBS) messages reporting TEMPALT and SHIPALT completion will contain, in accordance with references (b) and (c), the following requirements:

(1) ACTIVITIES: Unit and installing activity identified.

(2) BACKGROUND: TEMPALT number, TEMPALT name, installation period dates, installation completion date, Ship's Force operational testing completion acceptance date.

(3) PROVIDED INFORMATION:

(a) Type of installation: New equipment, Upgrade, Design change, etc.

(b) TEMPALT number: XXXX K/D.

(c) Certifying Statement: "all work was accomplished in full compliance with applicable contractual standards, specifications and installation drawings as outlined in reference ( )". System Operation Verification Testing (SOVT) was completed on XX NOV XXXX, results were provided to Ship's Force.

(d) TEMPALT installation issues resolved: Ship's Installation Drawings require revision. All Liaison Action Requests submitted to the planning yard were resolved. Ship's Force has been provided copies of all Liaison Action Requests and red line drawings. Red line drawing forwarded to planning yard.

(e) TEMPALT Completion Report completed and forwarded XX Dec XXXX, results provided to Ship's Force.

(f) Equipment installed: example AN-BLQ-10 ES SYSTEM.

(g) Integrated Logistics Support provided: Tech manuals, Maintenance Requirement Cards library data, On Board Repair Parts.

(h) Training Provided: identify by name all personnel trained.

(i) Summary: installation schedule issues, delays, support required, etc.

(j) Anticipated TEMPALT removal date.

(4) POC: Point of Contact (POC) at installing activity.

(5) COMMANDING OFFICER COMMENTS: Describe any issues of concern, provide positive and negative comments and identify any other pertinent information.

c. All (SUBS) messages reporting TEMPALT removal will contain, in accordance with reference (b), the following requirements:

(1) ACTIVITIES: Ship's name and Hull number.

(2) BACKGROUND: TEMPALT Number and Title.

(3) PROVIDED INFORMATION:

(a) Date of removal.

(b) Certifying statement the ship was restored to original configuration.

(c) Removal Issues; any outstanding item preventing restoration.

(4) POC: Removal Activity POC.

d. To ensure the appropriate Technical Agencies are informed of the material problems or request for technical assistance the addressee guidance provided for Casualty Reporting located at www.hq.navy.mil/n3n5/ncc/casrep.htm (use all lower case) should be used for (SUBS) messages.

e. Appendices A through E provide samples of the message format to be used for (SUBS) messages.

APPENDIX A

SAMPLE (SUBS) INITIAL MESSAGE

OATUZYUW RUCORGP0054 2282105-UUUU--RUCBKMC.
ZNR UUUUU ZUI RUCOMCB4998 2290310
O 1730XXZ AUG XX
FM USS XXXXXXXXX
TO COMSUBRON XXXXX//
INFO COMSUBLANT NORFOLK VA//
COMNAVSEASYSCOM WASHINGTON DC//
COMSUBGRU XXX//
NAVSHIPYD NORFOLK VA//
XXXXX RMC XXXXX XX
SUBMEPP PORTSMOUTH NH
BT
UNCLAS
MSGID/GENADMIN/XXXXXXXX/0054/AUG//
SUBJ/(SUBS) EPM CIRCUIT BREAKER OVERCURRENT TRIPS **INITIAL**//
REF/A/DOC/NAVSEA/14MAR1995//
AMPN/REF A IS NAVSEA 0942-LP-005-2020/(C) MAIN PROPULSION GEARS WITH CH-1.//
POC/XXXXX./ENGINEER/USS XXXXXXXXXX/LOC:AT SEA
/EMAIL:ENG(AT) XXXXXXXXXX.NAVY.SMIL.MIL//
RMKS/**1. EXECUTIVE SUMMARY**: EMERGENCY PROPULSION MOTOR (EPM) CIRCUIT BREAKER AT EPM CONTROL PANEL (EPMCP) TRIPS ON OVERCURRENT WHEN TAKING THE EPM ABOVE 18 SHAFT RPM IN THE AHEAD DIRECTION. CONTROL OF EPM MOTOR ARMATURE CURRENT BETWEEN SPEEDS OF 13 AND 18 SRPM IS SENSITIVE, WITH MOTOR ARMATURE CURRENT SPIKING AS MOTOR SPEED IS INCREMENTALLY RAISED. THE EPM REMAINS OPERATIONAL AT SPEEDS LESS THAN 15 SRPM AHEAD. OPERATION ASTERN IS NORMAL.
2. BACKGROUND: SHIP IS CURRENTLY CONDUCTING POST-SRA SEA TRIALS. SHIPALT 3461K (EPM HIGH TORQUE CLUTCH) WAS INSTALLED DURING SRA. EPM OPERATION WAS TESTED SATISFACTORILY PIERSIDE ON XXAUGXX TO A MAXIMUM SPEED OF 15 SRPM AHEAD AND ASTERN WITH NO ABNORMALITIES NOTED.
3. DESCRIPTION OF PROBLEM:
A. WHILE SLOWLY BRINGING THE EPM FROM 13 TO 18 SRPM AHEAD BY INCREMENTALLY TURNING THE HANDWHEEL (LESS THAN 1/64TH TURN) CLOCKWISE THE MOTOR ARMATURE CURRENT SPIKES TO APPROXIMATELY 800 T0 1100 AMPS DC THEN RETURNS TO NORMAL STEADY RUNNING CURRENT (APPROX 250 AMPS DC). THE MAGNITUDE OF THE SPIKE IS DIRECTLY PROPORTIONAL TO THE MOTOR SPEED/HANDWHEEL POSITION. MOTOR FIELD CURRENT BEHAVES NORMALLY, RUNNING FROM 7-9 AMPS DC.
B. AS SPEED IS RAISED ABOVE 18 SRPM, AN ARMATURE CURRENT SPIKE OF 1800 AMPS DC IS INDICATED AS THE EPM BREAKER TRIPS. THE MOST LIKELY CAUSE OF THE BREAKER TRIP IS OVERCURRENT (RATED INSTANTANEOUS TRIP POINT IS 2800 AMPS DC), BUT THE AMMETER RESPONSE IS TOO SLOW TO REGISTER FULL DEFLECTION.
4. TROUBLESHOOTING EFFORTS:
A. PERFORMED CLEAN AND INSPECT OF EPM CONTROL PANEL AND CONTROLLER PER EL-26 A-5 AND A-2 SATISFACTORILY.
B. TESTED OPERATION OF EPMCP PER EL-26 R-2M SATISFACTORILY.
C. INSPECTED EPM CIRCUIT BREAKER SATISFACTORILY.
5. ASSISTANCE DESIRED: REQUEST FURTHER TROUBLESHOOTING GUIDANCE VIA MESSAGE BY XXAUGXX.

6. CO ASSESSMENT AND REPAIR DESIRES: ORIG IS CONTINUING WITH POST-SRA SEA TRIALS, LIMITING EPM TO 15 SRPM AHEAD. ADDITIONAL TROUBLESHOOTING WILL BE PERFORMED UPON SURFACING.//
BT
#0054
NNNN

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

APPENDIX B

SAMPLE (SUBS) UPDATE MESSAGE

OATUZYUW RUCORGP0054 2282105-UUUU--RUCBKMC.
ZNR UUUUU ZUI RUCOMCB4998 2290310
O 1730XXZ AUG XX
FM USS XXXXXXXXX
TO COMSUBRON XXXXX//
INFO COMSUBLANT NORFOLK VA//
COMNAVSEASYSCOM WASHINGTON DC//
COMSUBGRU XXX//
NAVSHIPYD NORFOLK VA//
XXXXX RMC XXXXX XX
SUBMEPP PORTSMOUTH NH
BT
UNCLAS
MSGID/GENADMIN/XXXXXXXX/0054/AUG//
SUBJ/(SUBS) EPM CIRCUIT BREAKER OVERCURRENT TRIPS **UPDATE**//
REF/A/DOC/NAVSEA/14MAR1995//
AMPN/REF A IS NAVSEA 0942-LP-005-2020/(C) MAIN PROPULSION GEARS WITH CH-1.//
POC/XXXXX./ENGINEER/USS XXXXXXXXXX/LOC:AT SEA
/EMAIL:ENG(AT) XXXXXXXXXX.NAVY.SMIL.MIL//
RMKS/**1. EXECUTIVE SUMMARY**: EMERGENCY PROPULSION MOTOR (EPM) CIRCUIT BREAKER AT EPM CONTROL PANEL (EPMCP) IS STILL EXPERIENCING TRIPS ON OVERCURRENT WHEN TAKING THE EPM ABOVE 18 SHAFT RPM IN THE AHEAD DIRECTION. CONTROL OF EPM MOTOR ARMATURE CURRENT BETWEEN SPEEDS OF 13 AND 18 SRPM IS SENSITIVE, WITH MOTOR ARMATURE CURRENT SPIKING AS MOTOR SPEED IS INCREMENTALLY RAISED. THE EPM REMAINS OPERATIONAL AT SPEEDS LESS THAN 15 SRPM AHEAD. OPERATION ASTERN IS NORMAL.
2. BACKGROUND: SHIP IS CURRENTLY CONDUCTING POST-SRA SEA TRIALS. SHIPALT 3461K (EPM HIGH TORQUE CLUTCH) WAS INSTALLED DURING SRA. EPM OPERATION WAS TESTED SATISFACTORILY PIERSIDE ON XXAUGXX TO A MAXIMUM SPEED OF 15 SRPM AHEAD AND ASTERN WITH NO ABNORMALITIES NOTED.
3. DESCRIPTION OF PROBLEM:
A. WHILE SLOWLY BRINGING THE EPM FROM 13 TO 18 SRPM AHEAD BY INCREMENTALLY TURNING THE HANDWHEEL (LESS THAN 1/64TH TURN) CLOCKWISE THE MOTOR ARMATURE CURRENT SPIKES TO APPROXIMATELY 800 T0 1100 AMPS DC THEN RETURNS TO NORMAL STEADY RUNNING CURRENT (APPROX 250 AMPS DC). THE MAGNITUDE OF THE SPIKE IS DIRECTLY PROPORTIONAL TO THE MOTOR SPEED/HANDWHEEL POSITION. MOTOR FIELD CURRENT BEHAVES NORMALLY, RUNNING FROM 7-9 AMPS DC.
B. AS SPEED IS RAISED ABOVE 18 SRPM, AN ARMATURE CURRENT SPIKE OF 1800 AMPS DC IS INDICATED AS THE EPM BREAKER TRIPS. THE MOST LIKELY CAUSE OF THE BREAKER TRIP IS OVERCURRENT (RATED INSTANTANEOUS TRIP POINT IS 2800 AMPS DC), BUT THE AMMETER RESPONSE IS TOO SLOW TO REGISTER FULL DEFLECTION.
4. TROUBLESHOOTING EFFORTS:
A. PERFORMED CLEAN AND INSPECT OF EPM CONTROL PANEL AND CONTROLLER PER EL-26 A-5 AND A-2 SATISFACTORILY.
B. TESTED OPERATION OF EPMCP PER EL-26 R-2M SATISFACTORILY.
C. INSPECTED EPM CIRCUIT BREAKER SATISFACTORILY.
D. MEASURED RESISTANCE OF FIELD RHEOSTAT THROUGH ITS ENTIRE RANGE OF MOTION. INITIALLY DISCOVERED SEVERAL REGIONS OF HIGH RESISTANCE

CONTACT. CLEANED RHEOSTAT TO LESS THAN 0.1 OHM THROUGHOUT RANGE OF MOTION, WITH NO RESULTANT CHANGE IN OPERATING BEHAVIOR.
5. ASSISTANCE DESIRED: REQUEST FURTHER TROUBLESHOOTING GUIDANCE BY XXAUGXX.
6. CO ASSESSMENT AND REPAIR DESIRES: ORIG IS CONTINUING WITH POST-SRA SEA TRIALS, LIMITING EPM TO 15 SRPM AHEAD. ADDITIONAL TROUBLESHOOTING WILL BE PERFORMED UPON SURFACING. PER REF A VOL 2 TAB V-A TABLE 4-3, SHIP'S FORCE WILL INSPECT FIELD RESISTOR FOR A POSSIBLE OPEN CIRCUIT.//
BT
#0054
NNNN

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

APPENDIX C

SAMPLE (SUBS) FINAL/CLOSEOUT MESSAGE

OATUZYUW RUCORGP0054 2282105-UUUU--RUCBKMC.
ZNR UUUUU ZUI RUCOMCB4998 2290310
O 1730XXZ AUG XX
FM USS XXXXXXXXX
TO COMSUBRON XXXXX//
INFO COMSUBLANT NORFOLK VA//
COMNAVSEASYSCOM WASHINGTON DC//
COMSUBGRU XXX//
NAVSHIPYD NORFOLK VA//
XXXXX RMC XXXXX XX
SUBMEPP PORTSMOUTH NH
BT
UNCLAS
MSGID/GENADMIN/XXXXXXXX/0054/AUG//
SUBJ/(SUBS) EPM CIRCUIT BREAKER OVERCURRENT TRIPS **FINAL**//
REF/A/DOC/NAVSEA/14MAR1995//
AMPN/REF A IS NAVSEA 0942-LP-005-2020/(C) MAIN PROPULSION GEARS WITH
CH-1.//
POC/XXXXX./ENGINEER/USS XXXXXXXXXX/LOC:AT SEA
/EMAIL:ENG(AT) XXXXXXXXXX.NAVY.SMIL.MIL//
RMKS/**1. EXECUTIVE SUMMARY**: THE MATERIAL ISSUE OF OVERCURRENT TRIPS OF
THE EMERGENCY PROPULSION MOTOR (EPM) CIRCUIT BREAKER HAS BEEN CORRECTED.
2. BACKGROUND: SHIP WAS CONDUCTING POST-SRA SEA TRIALS. SHIPALT 3461K
(EPM HIGH TORQUE CLUTCH) HAD BEEN INSTALLED DURING SRA. EPM
OPERATION WAS TESTED SATISFACTORILY PIERSIDE ON XXAUGXX TO A MAXIMUM
SPEED OF 15 SRPM AHEAD AND ASTERN WITH NO ABNORMALITIES NOTED.
3. DESCRIPTION OF PROBLEM:
A. WHILE SLOWLY BRINGING THE EPM FROM 13 TO 18 SRPM AHEAD BY
INCREMENTALLY TURNING THE HANDWHEEL (LESS THAN 1/64TH TURN)
CLOCKWISE THE MOTOR ARMATURE CURRENT SPIKES TO APPROXIMATELY
800 T0 1100 AMPS DC THEN RETURNS TO NORMAL STEADY RUNNING CURRENT
(APPROX 250 AMPS DC). THE MAGNITUDE OF THE SPIKE IS DIRECTLY
PROPORTIONAL TO THE MOTOR SPEED/HANDWHEEL POSITION. MOTOR FIELD
CURRENT BEHAVED NORMALLY, RUNNING FROM 7-9 AMPS DC.
B. AS SPEED WAS RAISED ABOVE 18 SRPM, AN ARMATURE CURRENT SPIKE OF
1800 AMPS DC WAS EXPERIENCED AND THE EPM BREAKER TRIPPED.
4. TROUBLESHOOTING EFFORTS:
A. PERFORMED TROUBLESHOOTING AS IDENTIFIED IN PROVIDED TECHNICAL ASSIST MESSAGES.
B. PROBLEM WAS FOUND TO BE THE FIELD RESISTOR WAS EXPERIENCING AN OPEN CIRCUIT DUE TO A LOOSE CONNECTOR LUG CAUSING A HIGH RESISTANCE CONNECTION. THIS PROBLEM WAS IDENTIFIED DURING THE INSPECTION OF EPM CONTROL PANEL AS DESCRIBED IN THE PROVIDED TECH ASSIST MESSAGE.
5. ASSISTANCE DESIRED: PROBLEM CORRECTED, NO FURTHER ASSISTANCE REQUIRED. THIS IS THE FINAL REPORT NO ADDITIONAL ACTION REQUIRED.
6. CO ASSESSMENT AND REPAIR DESIRES: EPM RESTORED TO FULL SERVICE. //
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NOTE: ENSURE MESSAGES ARE IN ACCORDANCE WITH CURRENT MESSAGE FORMAT AND CURRENT PLAD IS UTILIZED.

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APPENDIX D

SAMPLE (SUBS) SHIPALT/TEMPALT INSTALLATION MESSAGE

RATUZYUW RHBPHVA0098 0441139-UUUU--RUCBKMC.
ZNR UUUUU ZUI RUCOMCB0075 0472222
R 13XXXXZ FEB XX
FM USS XXXXXX//
TO COMSUBLANT NORFOLK VA//
INFO CNO WASHINGTON DC//
CNO WASHINGTON DC//
COMLANTFLT NORFOLK VA//
COMSUBGRU TWO//
COMSUBRON EIGHT//
NAVSUBSCOL GROTON CT//
SPAWARSYSCEN CHARLESTON SC//
SPAWARSYSCEN SAN DIEGO CA//
CBTDIRSYSACT DAM NECK VA//
NAVSURFWARCEN CARDEROCKDIV BETHESDA MD//
NAVSURFWARCENDIV CRANE IN//
SUPSHIP GROTON CT//
SUPSHIP NEWPORT NEWS VA//
NAVSHIPYD NORFOLK VA//
BT
UNCLAS
MSGID/GENADMIN/**UNIT NAME**/FEB//
SUBJ/**(SUBS)COMPLETION OF TEMPALT XXXXK FIRE FIGHTING STATION UPGRADE INSTALLATION (TEMPALT)**//
REF/A/MSG/CSL/XXXXXXJUN05//
REF/B/DOC/NAVSEA/MARXXXX//
NARR/REF A IS COMSUBLANT MESSAGE AUTHORIZING INSTALLATION OF TEMPALT XXXXK FIRE FIGHTING STATION UPGRADE ON **USS XXXXX**.
REF B IS NAVSEA TECHNICAL SPECIFICATION XXXXXXXXXX SHIP ALTERATION ACCOMPLISHMENT BY INSTALL TEAMS.//
POC/JOHN SMITH/INSTALLATION MGR/NUWC DIV NEWPORT/-
/TEL:XXX-XXX-XXXX//
RMKS/**1. ACTIVITIES:** THIS IS A JOINT USS XXXXX NUWC DIV NEWPORT MESSAGE.
2. BACKGROUND: TEMPALT 000K FIRE FIGHTING STATION UPGRADE WAS INSTALLED DURING PERIOD XXAUGXXXX THROUGH XXSEPXXXXX. SOVT WAS COMPLETED XXNOVXXXX AND THE FIRE FIGHTING STATION WAS ACCEPTED AS OPERATIONAL.
3. PROVIDED INFORMATION:
A. TYPE INSTALLATION: FIRE FIGHTING STATION UPGRADE.
B. ALTERATION NUMBER: XXXXK.
C. CERTIFYING STATEMENT: ALL WORK WAS ACCOMPLISHED IN FULL COMPLIANCE WITH APPLICABLE CONTRACTUAL STANDARDS, SPECIFICATIONS AND INSTALLATION DRAWINGS. AS OUTLINED IN REF (A) SYSTEM OPERATION VERIFICATION TESTING (SOVT) WAS COMPLETED ON XXNOVXXXX. RESULTS WERE PROVIDED TO SHIP'S FORCE.
D. INSTALLATION ISSUES: SHIP'S INSTALLATION DRAWINGS (SID) REQUIRE REVISION. ALL LIAISON ACTION REQUESTS (LAR) SUBMITTED TO THE PLANNING YARD WERE RESOLVED. SHIP'S FORCE HAS BEEN PROVIDED COPIES OF ALL LARS. RED LINE SHIPALT DRAWINGS WERE PROVIDED TO THE SHIP AND WILL BE PROVIDED TO PLANNING YARD.
E. ALTERATION COMPLETION REPORT COMPLETED AND FORWARDED XXDECXXXX.

F. EQUIPMENT INSTALLED: FIRE FIGHTING PRESSURE ENHANCER.
G. ILS PROVIDED: TECHNICAL MANUALS ITEM (CD), MIP# 0000/000-00 AND MRC CARDS, FIRE FIGHTING STATION LIBRARY DATA (CLASSIFIED), SSN-XXX
COP, (CDMD-OA WORK FILE). THE ON BOARD REPAIR PARTS (OBRP). WILL BE PROVIDED BY NAVICP WHEN THEY ARE PRODUCED BY SHIP'S FORCE.
H. TRAINING PROVIDED: MM1 JONES RECEIVED TWO HOURS OF OPERATIONAL TRAINING.
I. SUMMARY: THE INSTALLATION PROGRESSED ON SCHEDULE WITH NO MAJOR DELAYS. THE SUPPORT PROVIDED BY SHIP'S FORCE WAS EXCELLENT.
J. ANTICIPATED REMOVAL DATE. XXMARXXXX.
4. POC: NUWC DIV NEWPORT POC MR. JOHN SMITH (XXX)XXX-XXXX, E-MAIL SMITH (AT)NPT.NUWC.NAVY.MIL.
5. COMMANDING OFFICERS COMMENTS: NONE//
BT
#0098
NNNN

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

APPENDIX E

SAMPLE (SUBS) SHIPALT/TEMPALT REMOVAL MESSAGE

RATUZYUW RHBPHVA0098 0441139-UUUU--RUCBKMC.
ZNR UUUUU ZUI RUCOMCB0075 0472222
R 13XXXXZ FEB XX
FM USS XXXXXX//
TO COMSUBLANT NORFOLK VA//
INFO CNO WASHINGTON DC//
CNO WASHINGTON DC//
COMLANTFLT NORFOLK VA//
COMSUBGRU TWO//
COMSUBRON EIGHT//
NAVSUBSCOL GROTON CT//
SPAWARSYSCEN CHARLESTON SC//
SPAWARSYSCEN SAN DIEGO CA//
CBTDIRSYSACT DAM NECK VA//
NAVSURFWARCEN CARDEROCKDIV BETHESDA MD//
NAVSURFWARCENDIV CRANE IN//
SUPSHIP GROTON CT//
SUPSHIP NEWPORT NEWS VA//
NAVSHIPYD NORFOLK VA//
BT
UNCLAS
MSGID/GENADMIN/**UNIT NAME**/FEB//
SUBJ/**(SUBS) COMPLETED REMOVAL OF TEMPALT XXXXK FIRE FIGHTING STATION UPGRADE (TEMPALT)**//
REF/A/MSG/CSL/XXXXXXJUN05//
REF/B/DOC/NAVSEA/MARXXXX//
NARR/REF AIS COMSUBLANT MESSAGE AUTHORIZING REMOVAL OF
TEMPALT XXXXK FIRE FIGHTING STATION UPGRADE ON **USS XXXXX**.
REF B IS NAVSEA TECHNICAL SPECIFICATION XXXXXXXXXX SHIP
ALTERATION ACCOMPLISHMENT BY INSTALL TEAMS.//
POC/JOHN SMITH/INSTALLATION MGR/NUWC DIV NEWPORT/-
/TEL:XXX-XXX-XXXX//
RMKS/**1. ACTIVITIES:** THIS IS A JOINT USS XXXXX NUWC DIV NEWPORT
MESSAGE.
2. BACKGROUND: TEMPALT 000K FIRE FIGHTING STATION UPGRADE
WAS INSTALLED DURING PERIOD XXAUGXXXX THROUGH XXSEPXXXXX. SOVT
WAS COMPLETED XXNOVXXXX AND THE FIRE FIGHTING STATION WAS ACCEPTED
AS OPERATIONAL.
3. PROVIDED INFORMATION:
A. REMOVAL DATE: XXJUNXXXX
B. CERTYFING STATEMENT: SHIP RESTORED TO ORIGINAL CONFIGURATION.
C. REMOVAL ISSUES: ANY OUTSTANDING ISSUE PREVENTING FULL RESTORATION.
4. POC: NUWC DIV NEWPORT POC MR. JOHN SMITH (XXX)XXX-XXXX, E-MAIL
SMITH(AT)NPT.NUWC.NAVY.MIL.
5. COMMANDING OFFICERS COMMENTS: NONE//
BT
#0098
NNNN

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

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VOLUME VI

CHAPTER 41

MAINTENANCE TEAM

LISTING OF APPENDICES.

A Agenda

41.1 PURPOSE. The purpose of this chapter is to define and establish the Maintenance Team, its membership and responsibilities. Also, included are detailed requirements for regular meetings.

41.2 MAINTENANCE TEAM. Each ship shall have a formally structured Maintenance Team. The team is led by the Ashore Ship's Maintenance Manager and consists of representatives from the ship and the supporting shore maintenance infrastructure. The primary responsibility of the Maintenance Team is to manage the maintenance and modernization process in accordance with the maintenance policies, directives and business rules of the Fleet Commander, Type Commander (TYCOM) and the Regional Maintenance Center (RMC).

41.2.1 Core Maintenance Team. While there are many who contribute to the execution of ship maintenance and modernization, some key personnel have a continuing involvement in and responsibility for management of the overall planning and execution of the ship's maintenance and modernization. The core Maintenance Team shall consist of the following members:

a. Ship's Commanding Officer. Primary representative for the ship. (For Aircraft Carriers the Commanding Officer may delegate to a representative.)

b. Ashore Ship Maintenance Manager. Maintenance Leader who manages all maintenance and modernization, including assessments, requiring off ship assistance. Assignments are:

(1)	Surface Force	Port Engineer
(2)	Naval Air Force	TYCOM Maintenance Program Manager
(3)	Submarine Force	Maintenance Coordinator

c. Ship Material Maintenance Officer. Coordinates Maintenance Team activities with Ship's Force personnel. Assignments are:

(1)	Surface Force	Ship Material Maintenance Officer
(2)	Naval Air Force	Ship Maintenance Manager*
(3)	Submarine Force	3M Coordinator

* The Reactor Maintenance Officer fills this role for Nuclear Propulsion issues.

d. Project Superintendent. Manages government production work for Continuous Maintenance (CM), Continuous Maintenance Availability (CMAV) and Chief of Naval Operations (CNO) availabilities. For CNO availabilities, the Project Superintendent is the Senior Naval Supervisory Authority (NSA) Representative and has the overall responsibility to plan and execute availabilities. Assignments are:

(1)	Surface Force	RMC Ship Superintendent
(2)	Naval Air Force	Naval Shipyard (NSY) Project Superintendent
		RMC Ship Superintendent

e. Project/Program Manager. Manages planning, integration and execution of contracted work in CNO/CMAV availabilities and CM executed during maintenance Windows of Opportunity. Coordinates Maintenance Team activities with the RMC contracting functions for contracted work. Assignments are:

(1)	Surface Force	RMC Program Manager
(2)	Naval Air Force	Supervisor of Shipbuilding (SUPSHIP) Program Manager

(3)	Submarine Force	Regional Maintenance Officer or Naval Sea Systems Command (NAVSEA) Material Officer

f. Contractor Program Manager (when required). Manages authorized contractor/company work. Assignments are:

(1)	Surface Force	Multi Ship/Multi Option (MS/MO) Contractor Program Manager
(2)	Naval Air Force	Prime Contractor for SUPSHIP contracted work
(3)	Submarine Force	Prime Contractor for RMC contracted (non NSY) work

g. Maintenance Support Team.

41.2.2 Augmentation of the Maintenance Team. While core team members are permanent, augmentation may be required during the ship's training and maintenance cycle. Core team members may be assigned responsibilities for more than one ship. Additional members may be fully assigned, as needed. Some examples include SUPSHIP representative, RMC Technical and Logistics representatives, Carrier Planning Activity representatives, Submarine Maintenance Engineering, Planning and Procurement representatives, RMC Class Team Leader and other key members of the Integrated Project Team for Carrier Maintenance. Additional ship's members may be assigned including Reactor Officer, Engineer Officer, Combat Systems Officer and CNO Availability Manager. It is expected that the same personnel will return to the same hull when required for Maintenance Team augmentation.

41.2.3 Crew Swap. When a crew swap occurs that rotates a different crew to a hull, the non-crew members of the Maintenance Team shall remain with the hull and provide continuity in planning and execution.

41.3 RESPONSIBILITIES OF THE MAINTENANCE TEAM. The primary responsibility of the Maintenance Team is to manage the maintenance and modernization process in accordance with the maintenance policies, directives and business rules of the Fleet Commander, TYCOM and the NSA. The Maintenance Team has four principal roles:

41.3.1 Management of Ship Maintenance. The Maintenance Team ensures the ship's Current Ship's Maintenance Project (CSMP) (and Availability Work Package (AWP) for CVNs) are validated and accurately reflect the ship's material condition and current maintenance status. The Maintenance Team ensures there is an initial cost estimate in man-days and material dollars for all work candidates, including assessments and technical assistance. The estimates shall be developed by the Ashore Ship's Maintenance Manager during initial review of the work candidates to be as accurate as possible, based on available information such as return costs from similar jobs, Ashore Ship Maintenance Manager experience, NSA and other government prepared or approved estimates. These estimates shall be updated within the CSMP (and AWP for CVNs), as they are refined in order to provide the Maintenance Team with adequate data to plan maintenance actions. For CVNs, these estimates will be entered in the Proposed AWP and finalized in the Authorized AWP. The Maintenance Team coordinates inspections, certifications, assessments and assist visits in support of the class maintenance plan. Additionally, the Maintenance Team may provide on-scene assessment of equipment condition to develop valid and accurate work candidates. Specific responsibilities are:

a. Ship Commanding Officer.

(1) Directs efforts to identify all shipboard maintenance requirements and ensure accurate and timely entry into the CSMP.

(2) Chairs the Planning Board for Maintenance meeting.

(3) Assigns priorities to work candidates, taking into account fiscal controls.

(4) Reviews, plans and monitors accomplishment of organizational level work.

(5) Determines the affect of material deficiencies on mission capability and releases Casualty Reports (CASREP).

(6) Integrates Maintenance planning in the Ship's Operational Schedule.

(7) Works closely with the Ashore Ship's Maintenance Manager on the development and prioritization of the ship's Maintenance and Modernization Business Plan (MMBP).

(8) Recommends urgent and compelling decisions to the TYCOM.

b. Ashore Ship Maintenance Manager.

(1) Directs the Maintenance Team.

(2) Validates and estimates all off ship maintenance for assigned ship(s), including off-ship assessments.

(3) Assigns work candidates to the right time period, Maintenance Availability and Executing Activity based on the MMBP, operational schedule, Executing Activity capacity, material readiness requirements and cost benefit analysis.

(4) Maintains frequent contact with the Commanding Officer and conducts personal observations of shipboard conditions. Establishes and maintains an effective communications plan with the ship during deployment.

(5) First point of contact for all off ship maintenance and modernization requirements.

(6) Communicates, coordinates and tracks ship and applicable class problems.

(7) Schedules and assists the ship's Commanding Officer in conducting the Planning Board for Maintenance, including agenda development.

(8) Provides risk management assessment of all ship work requirements and develops prioritized ship work recommendations.

(9) Maintains the shore file CSMP accuracy and provides recommended changes to the shipboard CSMP to the Ship Material Maintenance Officer and 3M Coordinator.

(10) Coordinates and reviews material assessment plans with Maintenance Team and supporting activities.

(11) For CVNs, receives the Baseline AWP from the Carrier Planning Activity. Builds and refines the Proposed and Authorized AWPs.

(12) Recommends appropriate technical assist visits and inspections based on Class Maintenance Plan, TYCOM requirements and ship's input.

(13) Coordinates off-ship maintenance.

(14) Develops initial estimates to be as accurate as possible, based on information such as return costs from similar jobs and government prepared or approved estimates.

c. Project/Program Manager.

(1) Serves as the RMC/SUPSHIP Advance Planning Manager for contracted work on CNO availabilities and scheduled CMAVs conducted at contractor or government depots.

(2) Validates, brokers and tracks all assigned maintenance work items through execution.

(3) Acts as the RMC or SUPSHIP business agent for outside Executing Activities.

(4) Conducts post availability Hot Wash.

d. Ship Material Maintenance Officer.
(The Reactor Maintenance Officer fills this role for Nuclear Propulsion issues.)

(1) Commanding Officer's principal assistant for management of ship maintenance.

(2) Prepares the ship input to the Planning Board for Maintenance agenda in support of the Ashore Ship Maintenance Manager.

(3) Acts as ship's point of contact for maintenance issues.

(4) Maintains an accurate shipboard CSMP.

(5) Ensures submittal of accurate Work Candidates, 3M Maintenance Action Form (2K).

(6) Approves Work Candidate (2K) validations and modifications.

e. Contractor Program Manager.

(1) Provides information and advice to the government on matters of mutual concern to include contractor cost and time estimates, future work planning, contractor capability and capacity for varied work accomplishment (i.e., port loading), production management, integration of work from multiple activities and production problems for assigned availabilities.

(2) Provides recommendations for reduction of premiums in the accomplishment of work.

f. Project Superintendent. For CNO availabilities the Project Superintendent is the Senior NSA Representative and has the overall responsibility to plan and execute availabilities. Manages work planning, execution and resolves conflicts.

(1) Recommends cancellation of invalid work candidates if applicable.

(2) Maintains current status of production work.

(3) For RMC work:

(a) Provides recommendations regarding assignment of work candidates to RMC Production Department. Assignment is based on the capabilities and capacities of the RMC provided in existing directives.

(b) Because existing directives require that all off ship maintenance be initially screened to the public sector, the superintendent works closely with the Ashore Ship Maintenance Manager on the validation, screening and brokering of all work candidates.

(c) Ship checks Work Candidates (2K) as applicable and provides estimates on all I-level work candidates.

(d) Represents the RMC to Ship's Force for RMC Production maintenance work. Coordinates the performance of I-level work including all scheduling and availability coordination.

g. RMC Class Team Leader.

(1) Manages class procedures and provides work process improvement.

(2) Monitors total effort across core teams and corrects deficiencies/potential class related problems.

(3) Provides support for modernization of assigned ship class.

(4) Ensures that lessons learned identified during availability Hot Washes are applied across the ship class.

41.3.2 Budgeting for Ship Maintenance. The Ashore Ship's Maintenance Manager is responsible for the ship's MMBP. The Maintenance Team develops the budget recommendation for funding maintenance requirements for the fiscal year. The Maintenance Team assesses the ship's anticipated material condition for budget consideration including the validated CSMP, Class Maintenance Plan, planned fleet alterations, outstanding Departures From Specification, CASREPs and Board of Inspection and Survey material discrepancies. This MMBP shall address the funding required for CNO availabilities, advance planning and CM. Ashore Ship's Maintenance Manager and the Maintenance Team members will maintain their ship within the fiscal guidance defined by the approved MMBP. Chapter 33 of this volume describes the development and maintenance of the MMBP.

41.3.3 Logistics and Technical Expertise. The Maintenance Team members maintain a current, valid CSMP and AWP for CVNs that serve as the authoritative source for all information on maintenance requirements. All technical guidance and advice provided by the members of the Maintenance Team must be in compliance with Systems Command approved guidance and policy. In instances where action by a Technical Authority is needed, the Ashore Ship Maintenance Manager shall ensure this authorization is obtained. The effective logistics support for maintenance depends on the accuracy of the ship's configuration records. The Maintenance Team oversees prompt submission of change documentation pursuant to maintenance or modernization, validates change entries and ensures configuration records (e.g., Configuration Data Managers Database - Open Architecture) are updated.

41.3.3.1 Ship Commanding Officer.

a. Initiates requests for technical assistance, including distance support.

b. Ensures technical assistance final resolution satisfies ship's maintenance issue.

41.3.3.2 Ashore Ship Maintenance Manager.

a. Proposes technical assist requests.

b. Serves as the ship's point of contact for access to technical expertise for all ship maintenance and repair requirements.

c. Ensures Configuration Change Requests are promptly submitted.

d. Provides the ship with advice and guidance for maintenance and modernization requests/recommendations, such as the development of proposed Ship Changes.

41.3.3.3 Ship Material Maintenance Officer.

a. Requests and coordinates technical assist visits.

b. Submits, coordinates and tracks Departure From Specification.

c. Ensures initiation of Work Candidates (OPNAV 4790/2K) to request distance support and technical assists.

d. Monitors timely submission of Configuration Change Requests.

41.3.3.4 RMC Technical Representative.

a. Acts as primary point of contact for technical assist visits.

b. Obtains technical resolution for Departures From Specifications.

41.3.3.5 Project Manager. Ensures all specifications for work are developed using approved technical guidelines ensuring maximum use of current NAVSEA approved Standard Items and Standard Work Item templates (Master Specification Catalogue).

41.3.3.6 RMC NSY Logistician.

a. Monitor Configuration Management process.

b. Ensures timely action on submittal of Configuration Change Requests and follow to update configuration records and associated logistics support.

41.3.4 Availability Coordination. The Ashore Ship's Maintenance Manager works with the Maintenance Team to develop, plan, and coordinate scheduled availabilities, CM opportunities, and emergent repairs of assigned ships within the resources provided. The TYCOM shall enter CNO availabilities and associated routine tasks and authorized Fleet and Programmed Alterations into the appropriate Maintenance Automated Information System in accordance with standard availability planning milestones. The Maintenance Team serves as the point of contact for the RMC and Executing Activity in coordinating maintenance and planning activities. The maintenance team facilitates the orderly conduct of work candidate identification, validation and brokering.

41.3.4.1 TYCOM or Designated Representative (RMC Commander for Surface, Immediate Superior In Command for Submarines). During availabilities conducted under SUPSHIP management and control, the SUPSHIP may accomplish certain of these responsibilities.

a. Assigns scheduled CM, year long CM and Emergent Maintenance Availabilities.

b. Provides oversight on Ashore Ship Maintenance Manager recommended brokering of work.

c. Funds CNO and CM Depot Availability contracts.

d. Authorizes Growth and New Work.

e. Acts on contract cost performance concerns.

f. Resolves CNO availability scheduling issues.

g. Concurs with other contracting vehicles, as applicable.

h. Authorizes maintenance below Maintenance Figure of Merit (MFOM) threshold as funding permits.

i. Chairs post availability "Hot Wash" meetings.

j. Makes determination of Urgent and Compelling circumstances when necessary.

41.3.4.2 Ship Commanding Officer.

a. Works with the Ashore Ship's Maintenance Manager to develop the final work package submission for the ship.

b. Oversees work execution by maintenance activities.

c. Reports progress weekly to the TYCOM.

41.3.4.3 Ashore Ship Maintenance Manager.

a. Supports the RMC in planning assigned ship maintenance/modernization availabilities.

(1) Develops and schedules work packages.

(2) Creates CM availabilities.

(3) Recommends CM opportunities to the ship Commanding Officer and the NSA management.

(4) Conducts work specification reviews, in conjunction with the Planning Activity (for MS/MO contracts).

(5) Chairs preliminary planning meetings.

(6) Screens work candidates to appropriate level of maintenance (Organizational, Intermediate, Depot) and continuously final-screens Work Candidates (OPNAV 4790/2K).

(7) Brokers work candidates to scheduled availability periods.

(8) Integrates work candidates to form optimized work packages.

(9) Coordinates the development of depot repair cost estimates using experience, analysis and other applicable sources.

(10) Recommends resolutions to CNO scheduling issues.

(11) Assists NSA Project Manager with work package analysis for MS/MO contracts.

(12) Reviews assessment results for inclusion in work packages.

(13) Oversees Specification Review for contracts prior to solicitation.

(14) Provides availability evaluation input documentation during availabilities.

(15) Initiates Work Candidates (OPNAV 4790/2K) for service work.

b. Concurs with the issue of funds to the Executing Activity.

c. Executes the approved MMBP to best utilize windows of opportunity.

d. Coordinates maintenance availability scheduling and execution.

e. Makes recommendations to the ship Commanding Officer and management on any deferred work items.

f. Ensures completion Work Candidates (OPNAV 4790/2K) are entered into the CSMP and Regional Maintenance Automated Information System.

g. Documents availability final costs in CSMP.

h. Participates in lessons learned (Hot Wash-up) conferences as appropriate.

i. Presents and explains Maintenance Team metrics to management.

41.3.4.4 Project/Program Manager.

a. Reports costs, schedules and maintains the status of all CNO and CMAV work conducted at contractor and government facilities.

(1) Coordinates, schedules and administers advance planning functions.

(2) Participates in availability final cost validation.

(3) Participates in establishing controls to fund all repairs for an availability.

(4) Analyzes work package to maintain available dates, level load contractor and minimize premiums.

(5) Assures planning estimates are established for timely receipt of funds, requests funds and distributes relevant availability information.

(6) Coordinates review of both government and contractor estimates for "reasonableness and fairness". Recommends alternate contracting vehicles if applicable.

(7) Submits contract work packages to appropriate procurement activity for solicitation and monitors progress of contract award.

(8) Assists in review of contract work specifications.

(9) Uses Master Specification Catalog specifications for Fleet Fast Pay contract planning.

(10) Assists with Specification Review; tracks and records changes for Fleet Fast Pay contracts.

(11) Responds to contract bidders' questions during Fleet Fast Pay solicitation.

(12) Provides inputs for funding requirements and serves as the Maintenance Team funds manager for CNO availability preparation and execution.

(13) Chairs advance planning meetings.

(14) Reviews and accepts or modifies recommended availability milestones.

(15) Enforces depot availability "lock" dates.

(16) Updates appropriate product and pricing databases.

(17) Prepares advance planning status messages, fuel and ammunition offload, readiness to start, pre-availability agreement, monthly availability status messages and completion messages for scheduled CNO/CMAV availabilities.

b. Coordinates and oversees depot level work execution in government and contractor facilities.

(1) Coordinates interface of outside activities during availability execution (i.e., Systems Commander, TYCOM, In-Service Engineering Agent, Alteration Installation Teams and other customers).

(2) Oversees Contractor and NSY work during availability execution. Progresses and monitors other integrated availability work.

(3) Resolves problems that affect cost, quality, schedule and performance of availabilities or contracts assigned.

(4) Coordinates resolution of technical issues during availability execution (i.e., Departure From Specification, Condition Reports, Liaison Action Requests).

(5) Recommends growth and new work based on Business Case Analysis.

(6) Assists with Business Case Analysis preparation.

(7) Verifies that controls are sufficient to fund all repairs required to support operational commitments.

(8) Reviews cost reports for cost performance.

(9) Executes availability planning milestones.

(10) Prepares the Business Case Analysis for Growth and New Work recommendations and recommends resolutions to the Ashore Ship Maintenance Manager.

(11) Coordinates Urgent and Compelling requests.

(12) Provides input for funding requirements and serves as the Maintenance Team funds manager to accomplish contracted work.

(13) Reviews the authorization and funding, and submits information to the contracting officer for negotiation on Growth and New Work.

(14) Chairs weekly production progress meetings and provides regular status reports to TYCOM or designated representative.

(15) Reviews condition reports and evaluates submitted time and cost estimates for accomplishment or deferral in concert with the Ashore Ship Maintenance Manager's concurrence.

(16) Coordinates the "continuous" cost estimate review process (MS/MO contracts).

(17) Verifies funds availability and maintains funds tracking reports.

(18) Edits, correlates and performs quality audits of work specification packages in conjunction with Maintenance Team members.

(19) Oversees an independent government review of brokered work candidates for obligation of government funds and for execution.

(20) Ensures completion reports are initiated by maintenance Executing Activity and completes the Work Candidate (2K) documentation.

41.3.4.5 Contractor Program Manager.

a. Supervises contractor work.

b. Establishes and recommends availability milestones.

c. Reviews and submits condition reports.

d. Initiates completion reports for authorized work completed.

e. Recommends scheduling of work to best take advantage of port work loading conditions.

41.3.4.6 Ship Material Maintenance Officer.

a. Interfaces with the Ashore Ship Maintenance Manager and the maintenance executing activity to resolve maintenance issues.

b. Generates any new work requests along with supporting urgency information.

c. Ensures valid deferred work is incorporated into the CSMP.

d. Ensures Ship's Force verification of completed work and return of Completed Action (OPNAV 4790/2K) to the Ashore Ship Maintenance Manager.

e. Provides the Ship's Force work package to the executing activity and assists in coordinating the integration of Ship's Force work with the executing activity for CNO or CMAV availabilities.

f. Responsible to ensure ship's initial conditions are set for work to begin by outside activities:

(1) Systems and equipment are properly tagged out.

(2) Systems and equipment are de-energized, drained and depressurized.

(3) Work Authorization Forms (WAF) are properly executed.

41.3.4.7 Project Superintendent.

a. For CNO availabilities the Project Superintendent is the Senior NSA Representative and has the overall responsibility to plan and execute availabilities.

b. Responsible for the overall Project success in regards to Safety, Quality, Cost and Schedule.

c. Ensures functions, assignments and responsibilities of the NSA are achieved.

d. Manages work planning, schedule integration work execution and resolves conflicts among all Executing Activities.

e. Maintains current status of production work.

41.3.4.8 NSA Project Superintendent.

a. Coordinates work planned and performed by NSA Production Department.

b. Assists with availability final cost validation.

c. Assists with target controls verification to fund all repairs for an availability.

d. Attends availability Plan of the Day.

e. Ensures Completed Action (OPNAV 4790/2K) is initiated by maintenance activity for completed authorized work.

41.4 PLANNING BOARD FOR MAINTENANCE. A regularly scheduled meeting between the ship's Maintenance Team members and stakeholders (e.g., TYCOM, Immediate Superior In Command (ISIC), planning activity, SPM, etc.) to discuss ship-wide maintenance issues. This forum provides a routine and regularly scheduled management review of current planned off-ship and organizational maintenance, CSMP and AWP quality and accuracy, future maintenance and modernization planning, work prioritization, work integration and fiscal concerns. The objective is to ensure clarity of intent for both the ship's efforts and the shore infrastructure with respect to total ship maintenance, operational schedules and other concerns affecting ship material readiness. While the frequency of Planning Board for Maintenance meetings may vary due to a ship's schedule, a minimum of one meeting per month is expected. The Planning Board for Maintenance is the forum for discussing all maintenance issues, including metrics that are currently used to measure the maintenance effectiveness of the ship and the performance of the ship's assigned Maintenance Team.

41.5 BUSINESS RULES. Each maintenance team will incorporate the following business rules.

a. Government employees will be responsible for all Planning Board for Maintenance decisions.

b. The frequency of the Planning Board for Maintenance meetings may vary due to a ship's schedule; a minimum of one meeting per month is expected.

c. The meeting will be chaired by the Commanding Officer.

d. The core Maintenance Team shall participate in the Planning Board for Maintenance. Other attendees may participate as required.

e. The Ashore Ship Maintenance Manager will prepare the agenda and provide it to the Commanding Officer and core team members 48 hours in advance.

f. The agenda, Appendix A, provides a list of topic areas to be reviewed during the Planning Board for Maintenance. It does not require an exhaustive examination of each topic during the meeting. Rather the meeting can be used to report the results of detailed reviews, updates, problem investigations and analyses conducted by assigned teams outside of the Planning Board for Maintenance meeting.

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APPENDIX A

AGENDA

1. Ship's Schedule.

a. Deployments and Underway periods.

b. Scheduled Availabilities and Upkeep periods.

c. Inspections, Assists, Alteration Installation Teams, surveys and Assessments.

d. Ship special evolutions.

2. Management of Ship Maintenance.

a. CASREP.

(1) Status.

(2) New (anticipated).

b. Work candidates returned to ship for questions or issues.

c. Work candidates older than 180 days.

d. Work candidates to be passed to history.

e. CSMP/AWP review.

(1) "As Screened" Report (shows where all off ship jobs are screened).

(2) TA-4 work candidates.

(a) New work candidates requiring integration/de-confliction with other known work.

1 Compare new work candidate's location with other known work.

2 Compare new work candidate's equipment/system with other known work.

3 Compare new work candidate's priority with other known work.

(b) Completed TA-4 work candidates.

(3) Availabilities.

(a) Screened to Ship's Force availability (Ashore Ship's Maintenance Manager assists the ship with assigning work candidates to Ship's Force availabilities).

(b) Concurrent CNO Availabilities.

(c) CM Availabilities - planned accomplishment.

(d) Emergent Availabilities - unplanned accomplishment.

f. Ship's Baseline AWP.

(1) Items completed.

(2) Items scheduled for coming availabilities.

(3) Resolution of unaccomplished and unscheduled items.

3. Budgeting for Ship Maintenance.

a. Long term (5 year) maintenance plans.

b. Review and update the Ship's MMBP.

4. Logistics and Technical Expertise.

a. Discuss current issues/problem areas.

b. Departures From Specification.

c. Outstanding Technical Assists and Assessments.

d. Ship Configuration Control Issues.

5. Availability Coordination.

a. CNO availabilities.

(1) Class Maintenance Plan Assessments.

(2) Certifications.

(3) Modernization.

(4) Homeport.

(5) Preservation.

(6) Integrated System refurbishment.

(7) Discuss issues and update.

b. Availability milestones, CNO/CMAV. Refer to standard Planning Milestones.

c. Production Status.

d. Dock trial/Fast Cruise/Sea Trial Dates.

6. New Issues.

7. Current Metrics.

8. Ship Commanding Officer Issues.

VOLUME VI

CHAPTER 42

MATERIAL READINESS ASSESSMENT

REFERENCES.

(a) NAVSEA S9081-AB-GIB-010 - Reliability Centered Maintenance Handbook
(b) OPNAVINST 4700.7 - Maintenance Policy for U.S. Naval Ships
(c) COMNAVSURFPACINST 4700.1A/COMNAVSURFLANTINST 4700.1/CNRMCINST 4700.7 - Total Ship Readiness Assessment (TSRA)

LISTING OF APPENDICES.

A Assessment Process
B "Prerequisites and Test Requirements" Message (Example)
C "Readiness to Commence" Message (Example)
D "Completion Quicklook" Message (Example)
E Job Originator Identification Table

42.1 PURPOSE. To maintain units in a material condition that supports the required degree of operational readiness and the ability to accomplish assigned missions using a process designed to assess the right things at the right time with the right people using the right standards at the right cost. This process applies to all activities (e.g., Type Commanders (TYCOM), Regional Maintenance Centers (RMC), shipyards, System Commands, etc.) executing periodic material assessments (scheduled event) and focused system assessments (not a scheduled event) of key systems, equipments and programs that follow an established framework and methodology. When evaluating material condition, either partially or in its entirety, the material assessment Common Assessment Procedures or approved technical documentation, shall be used and the results properly documented in accordance with this chapter via Automated Work Notifications (2-Kilo) to include material assessment tasks, (e.g., Condition-Directed Maintenance Tasks from the Class Maintenance Plan) and any discrepancies. The desired outcome of the assessment process is identification and documentation of required work to maintain adequate material condition. Appendix A provides an outline of the Assessment Process. In addition, this process applies and shall be followed for the material evaluation piece of inspections, certifications, and visits (e.g., Board of Inspection and Survey (INSURV), Afloat Training Group, Safety Center, etc.) as defined below:

a. Assessment: A material assessment is part of the ship's Reliability Centered Maintenance (RCM) plan conducted by Unit personnel or by an external agent (e.g., Combat Systems Command, Control, Communications and Computer Assessment (C5RA)/Total Ship Readiness Assessment (TSRA)). Depending on the context, material assessments may be individual "tasks" or "events" that group together numerous individual material assessment tasks for accomplishment during a period of time in the ship's operational schedule. Discrepancy documentation will be in accordance with this chapter.

b. Certification: A certification is regulatory and is required at some periodicity to authorize operation of equipment or systems (e.g., Flight Deck Certification/Aircraft Launch and Recovery/Magazine Certification). Often, continued certification requires that some material assessments be accomplished or have been accomplished prior to certification. Results of a certification and their distribution will be in accordance with the associated certification's instruction.

c. Inspection: An inspection is an evaluation conducted by an internal or external activity with regards to the performance of equipment, systems, programs or functions to a recognized standard (e.g., Diesel/Boiler/INSURV/3-M). Depending on the evaluation plan, this may involve judging the material condition of equipment or systems. Results of an inspection and their distribution will be in accordance with the associated inspection's instruction. Generally, results of the inspection will be provided to the unit's superior and/or higher authority.

d. Visit: A visit is the response to a request to provide technical assistance (e.g., NAVSAFECEN Visit). The technical assistance visit may or may not involve performing a material assessment. Required reports and their distribution from visits will be in accordance with the technical representative's organization's standard operating procedures.

e. Reliability Centered Maintenance: A methodology to develop or revise a maintenance approach with the objective of maintaining the inherent reliability of the system or equipment, recognizing that changes in inherent reliability may be achieved only through design changes.

f. Common Assessment Procedures: Common assessment procedures are assessments that, to the maximum extent possible, are common across platforms and serve all users for assessments, inspections and certifications. Common assessment procedures are RCM applicable and effective maintenance procedures that can be properly and consistently executed. They deliver accurate assessment and measurement of, determine and document discrepancies to, and specify repairs required to restore satisfactory material condition. Common assessment procedures satisfy the needs of work definition, inspections and certifications in a common document used both across ship classes and by all activities. The two types of commonality invoked are common across functional use and common across platforms with similar systems and equipment.

42.2 APPLICABILITY. This policy applies to all material condition assessments conducted on surface force ships, submarines, aircraft carriers, service craft and afloat/ashore activities under the cognizance of United States Fleet Forces Command and Commander, Pacific Fleet (e.g., Pre-Availability Testing, Point of Entry Testing, Common Assessment Procedures, TSRA, C5RA, Boiler Inspection, Diesel Inspection, etc.). This policy does not apply to the following special categories:

a. Reactor and Primary support systems under Naval Sea Systems Command 08 cognizance.

b. Fleet Ballistic Missile systems under the cognizance of Director, Submarine Strategic Program.

c. Naval aircraft and avionics equipment.

d. Post repair testing (e.g., hydrostatic test, Non-Destructive Testing, etc.).

e. Operational examinations (e.g., Tactical Readiness Examination, Pre-Overseas Movement certification, etc.).

42.3 OBJECTIVES. The principal objectives are:

a. Identify and document system/equipment deficiencies.

b. Improve unit's material readiness at the equipment/systems level.

c. Identify and define work for upcoming maintenance availabilities.

d. Standardize how the fleet conducts material assessments.

(1) Certifications, inspections and visits tasks shall use common assessment procedure standards and criteria in judging material condition.

(2) Assessments use standardized detailed procedures to determine material condition.

e. Identify material assessment training deficiencies and document any deficiencies using a Work Notification (2-Kilo). Conduct over-the-shoulder training for unit personnel.

f. Identify deficiencies with the Class Maintenance Plan (CMP) and document deficiencies using a Work Notification (2-Kilo).

g. Identify deficiencies with configuration or configuration data using Maintenance Figure Of Merit (MFOM)/Mission Readiness Assessment System.

42.4 PRINCIPLES. The critical success factors for a single integrated, effective material assessment process are:

a. Assessment procedures produced using a common assessment procedure development process based on RCM principles as discussed in reference (a).

b. Assessment procedures standardized to the maximum extent possible and identified in the CMP.

c. A standardized assessment tool set used to plan, execute and report assessments.

d. Assessment results recorded in a common shared data warehouse.

e. Accomplished using a common material assessment process, as defined below.

f. Assessment process has an effective method of feedback for periodic reviews and analysis for improvements.

42.5 MATERIAL ASSESSMENT PROCESS.

42.5.1 Discussion. The primary focus of the material assessment process is to coordinate and integrate the various Navy material assessment processes into a single, integrated, effective process designed to evaluate, measure and report individual unit's material condition. This information will be used to improve fleet readiness, ship design, maintenance and modernization identification, as well as the self-assessment capabilities of fleet units. Activities performing assessments are encouraged to communicate with each other to avoid duplicate work. Additionally, the assessment process will provide data to help determine a unit's ability to reach its expected hull life, measure the effectiveness of the CMP and identify potential crew training deficiencies.

42.5.2 Material Assessments. Units will undergo assessments per the CMP and as scheduled by the TYCOM. Systems and equipment are selected for assessment based upon:

a. The CMPs.

b. Ship Class trends.

c. Unit requests.

d. Review of the Current Ship's Maintenance Project (CSMP).

e. Maintenance Team inputs.

f. Integrated Condition Assessment Systems (ICAS)

g. Integrated Performance Assessment Reports

h. Corrosion Control Information Management Systems

i. Master Assessment Index

42.5.2.1 Surface Force TSRA Material Assessments. TSRA visits are nominally two weeks in duration. However, at the discretion of the TYCOM, TSRA events may be scheduled for more or less than two weeks in order to avoid conflicting with operational schedules. When the TSRA event is scheduled for less than two weeks, the focus of the TSRA will be identification and documentation of systems deficiencies.

42.5.3 Assessment Authorizing. The Platform Program Manager develops the CMP requirements as outlined in reference (b), and provides the requirements to the Platform TYCOM, who develop the assessment work packages and initiate assessments via "go assess work notifications" (GA2-K). Many factors determine what items will be selected for assessment, including the level of risk, funding constraints, ship's availability and ongoing maintenance and modernization. RMCs are tasked by Commander, Naval Sea Systems Command to support surface ships under the cognizance of Commander, Naval Surface Force Atlantic and Commander, Naval Surface Force Pacific to plan and execute TSRAs.

a. The CMP contains two types of assessment notifications that may influence the agenda:

(1) Scheduled assessments.

(2) Unscheduled "As needed" or "pulled assessments" ("Go Assess" maintenance notification). The Go Assess maintenance notification (GA2-K) identifies the equipment and the associated assessment procedure which shall be used.

b. Individual material assessments (not more than five assessment procedures) may be scheduled outside of a scheduled assessment event or availability if they can be planned and coordinated on a not to interfere basis with the unit's combined schedule (operational and maintenance). A larger number of assessments or assessment events require additional planning, integrated scheduling and project management (e.g., C5RA, TSRA, Carrier Material Assessment Team, etc.). In this case, a maintenance availability should be used or added to the ship's schedule. These assessment notifications are screened and brokered to the appropriate executing activity.

c. All material assessments are scheduled in accordance with the CMP and should not be repeated or duplicated by multiple activities. Assessment results shall be shared and used by multiple activities.

d. Surface Force TSRAs will include comprehensive assessments of ship's Hull, Mechanical and Electrical, combat systems, Command, Control, Communications, Computers and Intelligence systems, support equipment and logistics condition per reference (c). TSRAs are tailored material assessment packages scheduled to occur at specific times during a ship's schedule to improve maintenance availability planning, CSMP management, equipment repair, Ship's Force technician proficiency and operational availability. The Master Assessment Index process is used by Surface TYCOM as a risk prioritization model to assist in the development of the TSRA agenda.

42.5.4 Assessment Planning. For scheduled material assessments or events, the Executing Activity identifies a Team Leader and develops the execution plan. The plan contains all of the necessary information required to complete the assigned tasks and should be integrated with the unit's schedule. Conduct assessments using the applicable pieces of the standard assessment tool set.

42.5.5 Assessment Execution.

a. Work with the unit's personnel to assess, analyze and document the material condition in accordance with standard procedures. Maintain good communications with all levels of unit personnel. Train unit personnel in assessment procedures and techniques.

b. The assessment includes validation of equipment configuration, evaluation of the maintenance periodicity and effectiveness, evaluation of the assessment periodicity.

c. Documentation of assessment results by the equipment Subject Matter Expert (SME) will include all required data. A maintenance ready work notification (2-Kilo) that is sufficiently defined, contains correct and complete information, provides an accurate diagnosis, and provides an applicable, effective and feasible recommended resolution. A properly validated maintenance ready work notification (2-Kilo) should allow the planning and executing activities the ability to understand the requirement and not to expend additional manpower or time obtaining needed information for any deferred maintenance, and completion of the assessment maintenance notification. All Unclassified Non-Nuclear Naval Propulsion Information/Naval Nuclear Propulsion Information assessment results and data will be handled in accordance with current regulations and standing guidance from NAVSEA 08.

d. During Surface Force TYCOM TSRA assessments, repairs will be accomplished based on priority, availability of parts, Ship's Force support, SME availability or time remaining in the TSRA.

e. Conduct assessments using the Automated Work Notification software contained in Afloat Toolbox for Maintenance. This software is located in the MFOM Suite. All collected data is stored in the MFOM data warehouse.

f. Certifications, inspections and visits shall document material deficiencies on an Automated Work Notification (2-Kilo) that at a minimum identifies the configuration item and adequately describes the symptoms and/or conditions that are below standards. For example, the 2-Kilo may identify that a specific component does not function properly and requests assistance to troubleshoot/diagnose system discrepancy. If the deficiency is clearly understood, the assessor is required to record what they know or understand the deficiency to be.

42.5.6 Assessment Reporting.

a. The Executing Activity conducting the assessment should analyze assessment results and notify the Commanding Officer or his designated representative of any findings that could result in a Casualty Report, underway limiting or Repair Before Operate condition. The System Command (NAVSEA 05, SPAWAR 05 or NAVAIR) shall identify material improvement recommendations for new construction, future alterations or further analysis by the technical community.

b. For Surface Force Ships, RMC shall send a Prerequisite and Test Requirements message per reference (c) at least three weeks prior to the start of the event.

c. For Surface Force Ships, the ship shall send a Readiness to Commence message per reference (c) no later than five days prior to the scheduled event.

d. Report assessment results using the standard assessment tool set:

(1) To include whether an assigned assessment procedure was completed, partially completed or not accomplished.

(2) To produce a maintenance ready work notifications (2-Kilo) for each discrepancy identified during the assessment. Determine with unit personnel their repair capability/capacity when recommending level of effort, (i.e., Organizational, Intermediate or Depot repair).

e. To identify Integrated Logistic Support deficiencies and pass to TYCOM/Global Navy Distant Support to research and resolve, reporting any configuration discrepancies.

f. To provide any procedure discrepancies, validation and periodicity feedback.

g. To document man hours and costs.

h. For Surface Force Ships, RMC shall send a TSRA Completion message per reference (c) no later than five business days after TSRA completion.

42.5.7 Standard Assessment Tool Kit.

a. The standard assessment tool kit consists of:

(1) The catalog of approved assessments outlined in the ship's CMP. The procedure should be written in a format appropriate to the activity and experience of the personnel assessing (i.e., Maintenance Requirement Card for Unit personnel, Task Group Instruction for Naval shipyards, standard item for private shipyards, etc.).

(2) If an equipment or system assessment does not exist, one must be developed in accordance with the assessment technical guide and identified in the CMP.

(3) All assessments shall be planned, executed and reported using the Fleet approved assessment computer application(s) and the results recorded in the Fleet designated data warehouse.

42.5.8 Assessment Personnel.

a. When assessments are conducted by the unit's personnel, they should be from a rating associated with the equipment being assessed (operationally knowledgeable) and should be experienced in conducting assessments.

b. Outside activity personnel should be technically knowledgeable in the area they will be assessing and considered SMEs. Additionally, they should be trained on the assessment process, how to document the material condition of the equipment or system and basic RCM principles as discussed in reference (a).

42.6 RESPONSIBILITIES.

42.6.1 Fleet Commander. Fleet Commander shall:

a. Maintain a common material assessment process and policy. Conduct periodic reviews of processes and procedures as recommended by TYCOMs and technical warrant holders.

b. Be the Fleet's advocate and single point of contact for all material assessment issues to include:

(1) Policy.

(2) Training, assessment criteria.

(3) Procedures.

c. Provide and support a standard material assessment tool set.

d. Review the personnel and monetary resources required for the operation, improvement and support of the material assessment process and provide for these requirements in the budget effort.

e. Establish minimum standards of continuous program improvements for the TYCOMs.

42.6.2 Type Commander. TYCOMs/Immediate Superior In Command shall:

a. Schedule and authorize material assessments.

b. Define the scope of material assessment.

c. Provide funding for execution and support when not part of the mission funded executing activities Capabilities Plan.

d. Conduct periodic reviews of the material assessment process.

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

f. Evaluate units ability to self assess and report training deficiencies to the appropriate activity.

42.6.3 Material Assessment Executing Activity. The Material Assessment Executing Activity shall:

a. For RMC managed assessments, the RMC will send a Prerequisites and Test Requirements Message as directed by the TYCOM. Appendix B provides a sample message template. When requesting SMEs from another RMC for Assessment Events (TSRA, C5RA), the requesting RMC will fund travel and per diem expenses for government and military SMEs. For Surface Force Ships, use reference (c) sample message template and supplemental guidance for all TSRA events.

b. Conduct unit pre-visit brief in order to affect maximum support for the visit.

c. Assist the Assessment Team with access to the base and unit.

d. Review documented system deficiencies. Determine system material condition using established test procedures and unit's input. Unit personnel shall be included in this process as a training effort.

e. Task the Team Leader to provide daily progress reviews to unit assessment event coordinator.

f. Determine, in concert with Unit personnel, the correct maintenance level (Operational, Intermediate, Depot) to correct deficiencies.

g. Document man hours expended and assessment results using the standard assessment tool set and record the results of the "Go Assess" maintenance notification (GA2-K).

h. Document assessment deficiencies via maintenance notification.

i. Establish configuration baseline (sight validation) of selected systems to upgrade logistics support documentation. Initiate configuration changes for direct input into the ship's maintenance management system.

j. Assist unit personnel in repair and groom, as required, and as dictated by time/resource constraints and operational necessity.

k. Assist unit personnel in identifying material requirements to effect repairs.

l. Provide an out brief to the unit's Commanding Officer (or his representative), describing significant findings. Additionally, ensure all maintenance work notifications are loaded into the unit's CSMP and shore files complete and intact.

m. For Surface Force Ships, RMC shall send a TSRA Completion message per reference (c) no later than five business days after TSRA completion.

n. Support assessments as requested by the TYCOM.

o. Initiate change recommendations for program improvement.

p. Ensure all assigned personnel are experienced, knowledgeable and qualified as required.

42.6.4 Commanding Officer. Commanding Officers, as directed by the TYCOM, for scheduled assessments should:

a. Prepare for assessments events in accordance with this instruction.

b. Designate a senior management representative as the unit's assessment event coordinator.

c. Send, as directed by the TYCOM, a Readiness to Commence assessment message no later than five working days prior to the scheduled start of the assessment event. Appendix C provides a sample message template. Reference (c) provides a sample message template for all TSRA events. Include contact information for the ship's coordinator and key unit personnel.

d. Provide support for assessment team (e.g., ICAS data, access to specific spaces, electrical power and cooling water requirements, man aloft equipment tag-out and Radio Frequency radiation requirements, a secure space, Shipboard Nontactical Automated Data Processing Program/Legacy Organizational Maintenance Management System – Next Generation, Internet access and e-mail accounts).

e. Prepare systems/equipments, tag outs, Work Authorization Form, request support services and generate Quality Assurance packages as required.

f. Ensure there are no conflicting evolutions, training, drills, field days, major system overhauls or other events that would detract from the timely and efficient completion of the assessment event that have been planned or scheduled.

g. Reschedule the preventive maintenance requirements that will be accomplished during the assessment event to eliminate redundant accomplishment if the assessment is scheduled to occur so that no greater than one-half (1/2) of the scheduled periodicity is exceeded.

h. Host assessment event briefings.

i. Ensure the 3-M Coordinator, Functional Area Supervisors and the Supply Officer (or representative) are available as needed during the Assessment.

j. Ensure divisional personnel are assigned to work closely with the Assessment Team SMEs during testing and repair to maximize On the Job Training and awareness of identified equipment problems.

k. Remove key maintenance personnel from the watch bill during normal working hours in order to improve efficiency of the assessment event.

l. Correct material discrepancies as time permits.

m. Send, as directed by the TYCOM, a Quicklook completion message within five working days following the completion of the assessment event. Appendix D provides a sample message template. Additionally, include in the Quicklook report feedback and recommendations to the TYCOM to support continuous improvement of the assessment event process.

NOTE: INDIVIDUAL MAINTENANCE ASSESSMENTS (NOT MORE THAN FIVE ASSESSMENT PROCEDURES) MAY BE SCHEDULED OUTSIDE OF A SCHEDULED ASSESSMENT EVENT OR AVAILABILITY. HOWEVER, THEY STILL NEED TO BE COORDINATED WITH THE SHIP'S SCHEDULE AND SHOULD NOT INTERFERE WITH OPERATIONAL REQUIREMENTS.

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APPENDIX A

ASSESSMENT PROCESS

1. Assessment Background, Scope, and Organizational Responsibilities.

   a. The Fleet Material Assessment Process provides comprehensive testing of equipment and/or system(s) to determine their current state of material readiness. The resultant data assists maintenance efforts to attain a high state of overall material readiness.

   b. This document provides supplemental information to assist in the execution of a material condition assessment. This material assessment process does supersede or supplant other instructions or notices covering material assessment.

   c. An SME may elect to conduct a material assessment procedure for the purposes of troubleshooting equipment and/or system(s) as part of a Fleet Technical Assistance.

   d. Job Sequence Numbers will be assigned in accordance with Appendix E.

   e. Only material assessment procedures currently identified in the CMP shall be used. If a material assessment is not in the CMP, the executing activity must process a Departure From Specification through the appropriate TYCOM and technical authority before it can be scheduled and performed.

   f. A material assessment is part of the ship's RCM plan conducted by Unit personnel or by an external agent (e.g., C5RA/TSRA). Depending on the context, material assessments may be individual "tasks" or "events" that group together numerous individual material assessment tasks for accomplishment during a period of time in the ship's operational schedule.

2. Individual Material Assessment.

   a. Scheduling and Preparing for an Individual Material Assessment.

      (1) The term "Unit" applies to Ship's Force and shore personnel being assessed.

      (2) Due to the simple nature of this type of assessment, requests will normally be accomplished through a Go Assess Maintenance Notification (GA2-K). The assessment may be requested by a unit's TYCOM, unit's Immediate Superior in Command (ISIC), Maintenance Team or by the unit itself.

      (3) Once the assessment is scheduled, the SME assigned should ensure there will be proper support for performing the material assessment (e.g., tag-out, equipment operation, initial system conditions, material history, properly calibrated test equipment).

      (4) If an assessment was scheduled more than two weeks in advance, the SME should make a courtesy phone call or send an email message as appropriate to ensure schedule changes have not occurred.

   b. Conducting the Individual Material Assessment.

      (1) Each Individual Material Assessment will have an in brief with the Commanding Officer or his designee. The in brief will include an agenda of the assessment, what procedures will be used to assess the equipment/system(s) and unit specific safety policies. Daily briefs will occur, as appropriate.

      (2) Upon the completion of the in brief, the SME(s) will team with the unit's point of contact to begin the assessment. Benefits of this teaming arrangement include training of personnel and meeting all safety requirements. Training is part of the material assessment and unit personnel should be present during the assessment.

      (3) In the event the assessment discloses significant equipment/system failure(s) that prevents completion of the assessment, the SME shall notify the Commanding Officer or his designee and coordinate repairs if appropriate.

c. Completing the Individual Material Assessment.

(1) All material discrepancies will be documented on a maintenance notification (2-Kilo) and uploaded to the CSMP. The goal is to provide an uploadable file of all final discrepancies upon completion of the assessment but no later than five working days.

(2) The SME shall provide the Commanding Officer or his designee with an out brief. If requested by the unit, a formal final report of the assessment will be provided no more than 30 days after the conclusion of the individual assessment.

3. Assessment Availabilities.

a. Five or more concurrently scheduled assessments require additional planning, integrated scheduling and project management.

b. Preparing the assessment.

(1) The size and complexity of an assessment availability generally requires that it be scheduled as part of a maintenance availability or an individual event. All material discrepancies will be documented on a maintenance notification (2-Kilo) and uploaded to the CSMP. The goal is to provide an uploadable file of all final discrepancies upon completion of the assessment but no later than five working days.

(2) The unit should prepare and release the Readiness to Commence message no later than five working days prior to commencement of the assessment, if required by the TYCOM. Appendix C provides a sample format.

(3) The person designated to manage the Assessment Availability is referred to as the Team Leader or Assessment Director and his duties are as follows:

(a) Prepare and release the Prerequisites and Test Requirements message four weeks prior to the start of the assessment. Appendix B provides a sample format.
(b) Arrange for adequate work space and computer/network support.
(c) Ensure all members of the team are on the unit's access list.
(d) Work with the unit's maintenance team to ensure that the maximum benefit may be realized for the scheduled material assessments.

(4) Extend an invitation to the material assessment out brief to the appropriate TYCOM/ISIC and maintenance team.

c. Conducting the Assessment.

(1) The Team Leader/Assessment Director will:

(a) Perform the task listed in paragraph 2.a.2 of this appendix.
(b) Conduct an in brief to ensure all assessment team members and unit personnel are given the latest guidance for the event.
(c) Verify the Standard Assessment tool kit is operational, that the proper configuration data is loaded and that the unit has provided the necessary computer network access (i.e., logins, passwords, accounts, etc.).
(d) Distribute appropriate technical documentation to conduct the assessment.
(e) Liaison daily or as required with the assessment team members to check on progress with their portion of the assessment.
(f) Conduct a daily brief of progress and report significant problem status with the Commanding Officer and/or designated staff.

d. Completing the Assessment.

(1) The Team Leader/Assessment Director will:

(a) Specify the time for final submission of assessment results.

(b) Provide major findings that pose a threat to personnel safety or equipment (e.g., inoperative alarms or safety devices; readings exceeding the limits of the assessment that are deemed unsafe or excessive fuel/oil leaks).
(c) Provide minor findings which are defined as any finding not considered to be a major finding and poses no threat to personnel.
(d) Findings for material history which do not impact on equipment system operation.
(e) Any repairs performed.
(f) Any over-the-shoulder training in support of conducting the assessment.

(2) The out brief will include:

(a) Report major discrepancies.
(b) Report the system(s)/equipment for which testing was not attempted, testing not completed and configuration changes were needed.
(c) Results of logistics discrepancies.
(d) Discrepancies assigned for follow-on technical assistance.

(3) Provide the ship with the draft Quicklook message within five working days of the completion of the assessment. A Quicklook message sample outline is provided as Appendix C.

(4) All material discrepancies will be documented on a maintenance notification (2-Kilo) and uploaded to the CSMP. The goal is to provide an uploadable file of all final discrepancies upon completion of the assessment but no later than five working days.

(5) The Team Leader shall provide the Commanding Officer or his designee with an out brief. If requested by the unit, a formal final report of the assessment will be provided no more than 30 days after the conclusion of the individual assessment.

(6) When requested, provide special report(s) and/or brief(s) to the TYCOM, ISIC, maintenance team or designated representative(s) to facilitate repair of specific deficiencies.

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APPENDIX B

"PREREQUISITES AND TEST REQUIREMENTS" MESSAGE (EXAMPLE)

FM (RMC)
TO USS (SHIP/SUB/CARRIER)
(ISIC)
(ADDITIONAL ADDRESSEES AS APPROPRIATE)
INFO (APPROPRIATE TO SHIP/SUB/CARRIER)
(ADDITIONAL ADDRESSEES AS APPROPRIATE)
(TYCOMS ADDRESSEES AS APPROPRIATE)
BT
MSGID/GENADMIN/(RMC)//
SUBJ/ASSESSMENT TASKING FOR USS (SHIP/SUB/CARRIER)//
REF/A/RMG/(ASSESSMENT)/(REFERENCE)//
REF/B/DOC/ASSESSMENT GUIDEBOOK/(DATE)//
REF/C/DOC/(TEST PLAN PROVIDER IF APPLICABLE)/(DATE)//
REF/D/CON/(SCHEDULING AUTHORITY)/(DATE)//
NARR/REF A IS (ASSESSMENT REFERENCE). REF B IS ASSESSMENT GUIDEBOOK. REF C IS SHIP'S TEST PACKAGE, IF APPLICABLE, FOR USS (SHIP/SUB/CARRIER). REF D IS (SCHEDULING AUTHORITY).//
POC/(LIST INFO AS APPROPRIATE)//
RMKS/1. IAW REFS A THRU D, ASSESSMENT WILL BE CONDUCTED ONBOARD USS (SHIP/SUB/CARRIER) STARTDATE-ENDDATE YYYY.
2. ASSESSMENT WILL PROVIDE THE FOLLOWING:
A. READINESS ASSESSMENT OF SYSTEMS MATERIAL CONDITION.
B. OVER-THE-SHOULDER MAINTENANCE TRAINING FOR SHIPBOARD PERSONNEL AS THEY PERFORM REQUIRED MAINTENANCE/CORRECTIVE ACTION.
C. ENTRY OF MAINTENANCE READY 2-KILOS INTO THE CSMP AND A CSMP VALIDATION FOR SYSTEMS ASSESSED.
D. (IF APPLICABLE) ASSESSMENT OF SHIP'S ELECTROMAGNETIC COMPATIBILITY POSTURE.
E. (IF APPLICABLE) CONFIGURATION REVIEW OF COSAL/SNAP DATABASE AND INVENTORY OF TECHNICAL MANUALS FOR SYSTEMS/EQUIPMENT (ELECTRONICS ORDNANCE) BEING ASSESSED.
F. (IF APPLICABLE) A SMALL ARMS READINESS REVIEW (SARR) IS OPTIONAL AND WILL BE CONDUCTED ONLY IF REQUESTED BY THE SHIP. THE SARR WILL HELP SHIP'S FORCE TO IDENTIFY POTENTIAL PROBLEM AREAS AND ENSURE QUALITY SMALL ARMS ARE ONBOARD FOR DEPLOYMENT.
3. BRIEFS AND CLEARANCE DATA:
A. PRE-BRIEF WILL BE CONDUCTED TO DISCUSS GUIDELINES, ESTABLISH REQUIRED SUPPORT, DISCUSS ANY TEST PLAN ISSUES AND REVIEW POSSIBLE CONFLICTING EVOLUTIONS. RECOMMEND ATTENDANCE BY CO, XO, DEPT HEADS, PRINCIPAL ASSISTANTS AND 3-M COORDINATOR.
B. RECOMMEND KICK-OFF BRIEF BE HELD ON THE FIRST MORNING OF THE EVENT.
C. ASSESSMENT DIRECTOR WILL PROVIDE DAILY PROGRESS UPDATES TO CO OR DESIGNATED REP.
D. AN OUTBRIEF WILL BE CONDUCTED AT THE CONCLUSION OF THE EVENT.
E. CLEARANCE DATA WILL BE PROVIDED BY SEPCOR.
4. USS (SHIP/SUB/CARRIER):
A. (IF APPLICABLE) RMC LOG REP WILL CONTACT SHIP FOR LOG DATA REQUIREMENTS PRIOR TO START OF ASSESSMENT.
B. TRAINING IN MAINTENANCE PROCEDURES AND PRACTICAL APPLICATION OF ONBOARD TEST EQUIPMENT AND TOOLS FOR INSTALLED SYSTEMS IS CONDUCTED. (IF APPROPRIATE) FOR MAXIMUM BENEFIT, REQ ALL TECHS, SUPPLY SUPPORT PERSONNEL AND 3-M COORDINATOR BE AVAILABLE FOR DURATION OF EVENT.

C. (IF APPLICABLE) TO FACILITATE CRYPTO VOICE/DATA CKT TESTING, REQ LOAD ALL APPLICABLE CRYPTO PRIOR TO EVENT START.

D. (IF APPLICABLE) DUE TO LARGE NUMBER OF PERSONNEL BOARDING EACH DAY, REQ PROCESS BE ESTABLISHED TO EXPEDITE BOARDING ACCESS.

E. THIS ASSESSMENT IS NOT AN INSPECTION AND NO PRE-EVENT TESTING IS REQUIRED. CONTINUE NORMAL PMS SCHEDULE.

F. IAW REF B, REQ TRANSMIT "READINESS TO COMMENCE" MESSAGE NLT ONE WEEK PRIOR TO START OF THE EVENT.

G. (IF APPLICABLE) RMC 2-M FLEET COORDINATOR WILL REVIEW SHIP'S 2-M PROGRAM. REQ SHIP'S 2-M COORDINATOR PROVIDE MODULE TEST AND REPAIR TRACKING SYSTEM (MTRTS) DATA FOR THE LAST TWO QTRS.

H. REQ ADVISE EARLIEST OF ANY SCHEDULE EVOLUTIONS WHICH COULD IMPACT THE CONDUCT OF THIS EVENT.

5. (ISIC): REQ ADVISE ALCON NAME AND TELEPHONE NUMBER OF STAFF MEMBER DESIGNATED AS ISIC REP.

6. REQ ALL SUPPORT ACTIVITIES ADVISE ALCON NAME/CLNC LEVEL OF REP(S) PROVIDING SUPPORT.
(LIST AS APPLICABLE TO THE ASSESSMENT)

7. REQ ALL TEAM MEMBERS REPORT ONBOARD NLT (TIME), DD MMM YY TO MEET WITH THE ASSESSMENT DIRECTOR (AND AS APPROPRIATE) TO OBTAIN TEST PLANS AND CONTROL SHEETS.

8. FOR FURTHER INFO CONTACT (LIST POC E-MAIL ADDRESS). (RMC) STANDS READY TO SUPPORT ALL FLEET UNITS 24/7 THROUGH OUR COMMAND DUTY OFFICER: COMM (###) ###-####, DSN ###-####, UNCLASSIFIED E-MAIL (INSERT ADDRESS), CLASSIFIED E-MAIL (INSERT ADDRESS), AND BATTLE-CHAT SERVER (INSERT ADDRESS).//

BT

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

APPENDIX C

"READINESS TO COMMENCE" MESSAGE (EXAMPLE)

FM USS (XXX)
TO (ISIC)
INFO (AS APPROPRIATE TO ACTIVITY)
BT
UNCLAS
MSGID/GENADMIN/USS XXX/-/OCT//
SUBJ/READINESS TO COMMENCE (ASSESSMENT)//
REF/A/DOC/TYCOM/YMD:2003XXXX//
AMPN/XXX INSTRUCTION 9093.1J PROVIDED INSTRUCTIONS TO CONDUCT XXX//
POC/XXX/LCDR/CMD/LOC:NORFOLK VA/TEL:XXX-XXX-XXXX//
RMKS/FOLLOWING IS SUBMITTED IAW REF A:
1. XXX ASSESSMENT SCHEDULED FOR: XXOCTOBERXX THRU XXOCTOBERXX.
2. ASSESSMENT TEST PLAN NEGOTIATED DURING PRE-BRIEF ON XXOCTXX.
COMMAND PREPARED TO SUPPORT ASSESSMENT EXCEPT FOR THE FOLLOWING
CONFLICTING EVOLUTIONS:
XXX INSPECTION XX-XX OCT XX
FORCE PROTECTION/DIET DRILLS WITH DUTY SECTIONS-DAILY
ALL HANDS TRAINING CONDUCTED WEEKLY.
3. TEST EQUIPMENT: FOLLOWING TEST EQUIPMENT AT CAL OR REPAIR
FACILITY. TEST EQUIPMENT SCHEDULED TO BE TURNED IN TO RMC
PRODUCTION DEPT FOR CAL DURING WEEK OF XXOCTXX. EDD BASED ON
SHOP LOADING:
(LIST ALL APPLICABLE EQUIPMENT)
4. PERSONNEL SHORTAGES/CRITICAL NEC
RATE NEC NMP ONBRD REMARKS
(LIST APPLICABLE BILLETS)
5. THE FOLLOWING SYSTEMS HAVE HAD MAJOR AITS/UPGRADES WITHIN
LAST 90 DAYS:
SYSTEM TYPE OF WORK DATE COMPLETED
(LIST ALL APPLICABLE EQUIPMENT)
6. THE STATUS OF THE FOLLOWING:
A. CURRENT ASI TAPES LOADED-823.
B. CURRENT CRYPTO LOADED DAILY AT 0001Z.
C. CURRENT SOFTWARE TAPES AVAILABLE IN ADP AND CS OFFICE.
D. MESSAGES TO SUPPORT RADAR RADIATION, SONAR AND COMMS
TRANSMISSIONS ARE IN PROGRESS. WILL COORDINATE WITH ASSESSMENT
TEAM TO DETERMINE ACTUAL RADIATION REQUIREMENTS.
E. KEYS FOR ORDNANCE ARE AVAILABLE.
F. TEST EQUIPMENT (253) AND GAUGES (112) ARE IN CALIBRATION;
WEIGHT TESTS AND CERTIFICATIONS ARE UP TO DATE FOR ORDINANCE
HANDLING EQUIPMENT, STAR GAUGES, ETC.
G. ULM-4 COMPLETED ON 10SEP07.
H. TACAN HAS BEEN FAA CERTIFIED.
I. OCSOT COMPLETED ON 30SEP07.
7. LIST OF WORK CENTER 1ST/2ND POCS FOR SYSTEMS WILL BE
PROVIDED AT 0900 IN-BRIEF ON 22OCT07 ON BOARD IWO JIMA.
8. UNCLAS NETWORK ACCESS AND OUTSIDE PHONE LINE WILL BE
PROVIDED IN CSMC.
9. ALL PRE-ASSESSMENT PMS CHECKS HAVE BEEN COMPLETED.
10. USS XXX IS READY TO COMMENCE ASSESSMENT ON XXOCTOBERXX.//
BT

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

APPENDIX D

"COMPLETION QUICKLOOK" MESSAGE (EXAMPLE)

FM (ASSESSMENT ACTIVITY OR USS)
TO (ISIC)
INFO (AS APPROPRIATE TO THE ACTIVITY)
BT
MSGID/GENADMIN/ASSESSMENT ACTIVITY OR USS/-/MAR//
SUBJ/QUICKLOOK REPORT FOR USS XXX MATERIAL INSPECTION (MI)//
REF/A/MSG/ASSESSMENT ACTIVITY/161402ZXXX04//
AMPN/REF A DOCUMENTS//
RMKS/1. AN ASSESSMENT WAS CONDUCTED ON USS XXX AT NAS NORTH ISLAND, CA DURING THE PERIOD XX-XX MAR 200X. CERTAIN DEFICIENCIES EXIST WHICH DEAL WITH THE XXX DEPARTMENT. THESE DEFICIENCIES ARE NOTED IN REF A.
2. SENIOR MEMBER COMMENTS:

A. THE SHIP WAS CLEAN AND WELL PREPARED FOR THE INSPECTION.

B. THE SHIP REPORTED A HISTORY OF XXX(SYSTEM AND DISCREPANCY).

C. THE RELIABILITY OF THE XXX SYSTEM IS SUSPECT. DURING THE COURSE OF THE INSPECTION, XXX WERE INOP DUE TO A NUMBER OF MATERIAL DEFICIENCIES AND XXX WERE INOP DURING THE DTE. THE SHIP HAS A MATERIAL HISTORY FILE THAT INDICATES A RECORD OF POOR RELIABILITY WITH XX CASUALTIES, INCLUDING XX CASREPS, DOCUMENTED OVER A PERIOD OF XXX DAYS. MANY OF THE CASREPS ARE RELATED TO PARTS NOT IN STOCK OR NOT CARRIED.

D. THE CONDITION OF THE DISTRIBUTED ELECTRICAL SYSTEM OUTSIDE OF THE XXX SPACES IS OF CONCERN. NUMEROUS UNLABELED/MISLABELED CIRCUITS, OVERSIZED/UNDERSIZED PROTECTIVE DEVICES, AND OTHER SAFETY DEFICIENCIES WERE NOTED.

E. TOPSIDE CORROSION, ESPECIALLY ALONG THE CATWALKS AND UNDER SPONSONS, WAS NOTED. THE SERIOUSLY DETERIORATED MAIN SPACE INTAKE PLENUMS SHOULD BE ADDRESSED IMMEDIATELY.

F. THE SHIP HAS NEVER HAD A COMPLETE OIL POLLUTION ABATEMENT SYSTEM (SPECIFICALLY AN OILY WATER SEPARATOR AND OIL CONTENT MONITOR) INSTALLED AND CONSEQUENTLY CANNOT COMPLY WITH EXISTING ENVIRONMENTAL PROTECTION LAWS. THE SHIP HAS ROUTINELY USED SPACE EDUCTORS TO REMOVE BILGE WATER WHILE AT SEA.

G. MINIMUM ACCEPTABLE EQUIPMENT FOR UNDERWAY OPERATIONS WAS ACHIEVED AT 1100 ON DAY TWO OF INSPECTION.

H. THE SHIP'S SELF-ASSESSMENT CAPABILITY WAS EVALUATED AS SATISFACTORY.

I. THE SHIP'S ABILITY TO RESOLVE SIGNIFICANT MATERIAL ISSUES DURING THE INSPECTION WAS EVALUATED AS SATISFACTORY.

3. THE FOLLOWING CASREPS WERE ACTIVE PRIOR TO THE MI:

NUMBER	NOMENCLATURE	CATEGORY
04XXX	XXXX	2
04XXX	XXXX	2
04XXX	XXXX	2

4. DEMONSTRATION RESULTS: SAT (0.80 - 1.00)/DEGRADED (0.60 - 0.79)/UNSAT (0.00 - 0.59):
- THE SELF-DEFENSE DTE WAS UNSAT (SCORE: 0.58) BECAUSE OF REDUCED DETECTION RANGES ON THE XXX SYSTEM, 3 OF 6 XXX WERE INOP OR DEGRADED, AND XXX FAILED TO CYCLE ROUNDS.
- THE XXX DEMONSTRATION WAS SAT (SCORE: 0.80).
- THE FULL POWER DEMONSTRATION WAS SAT (SCORE: 0.91). SEE REF A.
- THE QUICK REVERSAL AHEAD WAS SAT (SCORE: 0.98).
- THE QUICK REVERSAL ASTERN WAS UNSAT (SCORE: 0.50). SEE REF A.
- THE STEERING DEMONSTRATION WAS DEGRADED (SCORE: 0.63) BECAUSE THE RUDDER SWING RATES WERE OUT-OF-SPEC SLOW AND IMBALANCED.

- THE ANCHOR DROP DEMONSTRATION WAS SAT (SCORE: 0.89).
5. SIGNIFICANT MATERIAL DEFICIENCIES AND EQUIPMENT OPERATIONAL CAPABILITY (EOC) INCLUDE:

A. PROPULSION: 0.88. REF A DOCUMENTS DEFICIENCIES AND OBSERVATIONS NOTED IN THE XXX DEPARTMENT.

B. AUXILIARIES: 0.74.

- THE XXX WAS EXCESSIVELY WORN.
- 5 OF 8 XXX INDICATORS WERE INOP (CORRECTED).
- 10 OF 10 XXX HAD INOP OR OUT-OF-SPEC SAFETY SWITCHES (5 CORRECTED).
- 5 OF 5 XXX WERE INOP (3 CORRECTED).
- 17 OF 23 XXX HAD SIGNIFICANT DEFICIENCIES OR WERE INOP (13 CORRECTED).
- THE ACCOM LADDER UPPER PLATFORM WAS MISSING A THIRD LIFELINE.

C. COMBAT SYSTEMS: 0.83.

- 5 OF 6 XXX WERE INOP (2 CORRECTED).
- 2 OF 10 XXX WERE UNSAFE TO OPERATE (CORRECTED).
- 8 OF 10 XXX WERE UNSAFE TO OPERATE (CORRECTED).
- 25 OF 25 XXXX DID NOT HAVE REQUIRED FLOATATION AND HOLSTER SAFETY MODIFICATIONS INSTALLED.
- THE XXX WARNING BELL WAS INOP (CORRECTED).
- THE XXX WAS INOP (CORRECTED).
- THE CONDITION OF ELECTRONIC MATTING IN MANY XXX SPACES WAS NOT INSTALLED IAW NSTM CH 634 AND COVERED SIGNIFICANTLY CORRODED DECKS.
- THERE WERE SEVERAL SIGNIFICANT TOPSIDE AND MAST INSPECTION DISCREPANCIES INCLUDING VARIOUS CORRODED FERROUS FASTENERS AND ASSOCIATED HARDWARE, MISSING OR IMPROPERLY INSTALLED CLIMBER SAFETY RAIL PINS, AND MISSING ANTENNA SAFETY CUTOUT SWITCH RF HAZARD LABELS.
- THE CLIMBER SAFETY RAILS LOCATED ON THE XXX, NAVIGATION POLE, AND FANTAIL WERE NOT INSTALLED IAW THE NAVSEA STANDARD DRAWING.
- THE XXX WATER CIRCULATING PUMP WAS INOP (CORRECTED).

D. QUALITY OF SHIPBOARD LIFE: 0.83.

- THE FLAG PANTRY GARBAGE DISPOSAL HAD EXPOSED ELECTRICAL WIRES IN THE CABINET BENEATH THE SINK (CORRECTED).

PAGE 08 RUCOMFB8675 UNCLAS.

- THERE WERE NO DEEP FAT FRYER EMERGENCY DISCONNECT SWITCHES INSTALLED IN 5 OF 7 GALLEYS/PANTRIES.
- 17 OF 44 NEWLY INSTALLED GAYLORD HOOD FAIL-SAFE SWITCHES WERE INOP (CORRECTED).

E. NAVOSH: 0.84.

- 38 OF 41 XXX SAFETY NETS HAD DISCREPANCIES.
- IMMUNIZATION SUPPLIES WERE NOT STORED IN A BIOLOGICAL REFRIGERATOR THAT HAD HIGH/LOW TEMPERATURE AND LOSS OF POWER ALARMS INSTALLED (CORRECTED).
- 1 OF 5 BIOLOGICAL REFRIGERATORS WAS INOP.
- THE XXX CALL BUTTON SYSTEM AND XXX HEADS WAS INOP.
- 1 OF 3 MEDICAL/DENTAL STERILIZERS WAS INOP (CORRECTED).

6. VADM XXX, (CMD), RADM XXX, (CMD), AND RADM XXX, (CMD), WERE PRESENT FOR THE INSPECTION. CAPT XXX WAS THE SENIOR INSPECTOR.
7. PRESIDENT, BOARD OF INSPECTION AND SURVEY, CONCURS WITH THE FINDINGS.//
BT

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

APPENDIX E

JOB ORIGINATOR IDENTIFICATION TABLE

Code	Short Description
A	HM&E RA (SUB/AIR)
B	C5RA (AIR) - Local TYCOM
C	C5RA (National)
D	C5RA (AIR) - Local TYCOM
G	RMC Inputs (AIR) - Local TYCOM
H	RMC Inputs (AIR) - Local TYCOM
J	ICAS (National)
K	C5RA (SURF) - Local TYCOM
P	PMT OSAR (SUB) - Local TYCOM
Q	Created by RMAIS (National)
R	INSURV (National)
S	Sail Deficiencies (SUB) - Local TYCOM
W	Class Maintenance Plans (AIR, SUB, SURFACE)
X	Class Maintenance Plans (AIR, SUB)
Y	MST (SURF) Class Maintenance Plans (AIR) - Local TYCOM
Z	MST (SURF), CMP (National) - Z-alpha (National), Z-numeric (MST)

References to “National” values indicate that, in accordance with SHIPMAIN direction, an Information Technology product has been identified as the only authorized tool that will create 4790-2-Kilos containing the respective Job Originator code.

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VOLUME VI

CHAPTER 43

GUIDANCE FOR ENHANCED MODERNIZATION AND ALTERATION INSTALLATION TEAM INTEGRATION DURING AVAILABILITIES

REFERENCES.

(a) NAVSEA SL720-AA-MAN-030 - Navy Modernization Process Management and Operations Manual

43.1 CONCEPT.

a. Scope. This policy applies to all modernization work (Ship's Force, shipyard, Intermediate Maintenance Activity and Alteration Installation Team) conducted during all types of Availabilities (Chief of Naval Operations, Continuous Maintenance Availability, Fleet Maintenance Availability, etc.) on all platforms. This chapter compliments the support policy of the Fleet Modernization Program as described in Chapter 3 and Chapter 36 of this volume.

b. Overview. Ship availability duration must be limited to only that required to accomplish planned repairs and alterations. Unnecessary time in depot maintenance periods reduces the time when ships are operationally available to support the Fleet Response Plan. Accordingly, scheduling of production and test activity for all work must be optimized to keep availability schedule duration to a minimum. The key to duration optimization is rigorous, inclusive and detailed integrated planning, which encompasses all anticipated work into a balanced schedule. Once an integrated and executable schedule is established and agreed to by all participating activities, the Naval Supervisory Authority (NSA) shall be responsible and have the authority to manage the execution of the modernization through its completion.

c. This chapter provides planning and execution requirements for all modernization activities participating in an availability. Disconnected or diffused planning and execution creates local delays and disruption to the overall availability effort, creates additional coordination challenges for NSAs and Ship's Force, and results in excessive availability durations and higher secondary costs.

d. Essential to establishing an integrated and executable schedule is a stable and properly funded repair and modernization work package. Type Commanders and Program Managers must structure, plan and program repairs and installations with an understanding that they will be executed not in isolation, but as part of a larger, integrated effort with competing constraints and requirements. Accordingly, repair candidates and alterations not authorized at the Work Package Integration Conference (WPIC) will not be included in the integrated schedule, and will only be authorized after the WPIC when the NSA has advised the customer of the cost and schedule impact associated with a proposed late work addition.

NOTE: FOR SURFACE SHIPS SUSTAINMENT, TYPE 1 AND 2 ALTERATIONS (TERMED "INTERNAL EQUIPMENT ALTERATIONS") MAY BE INCORPORATED INTO THE PACKAGE UP TO A-75.

43.2 AVAILABILITY PLANNING BUSINESS RULES.

a. The NSA/Lead Maintenance Activity (LMA) has overall responsibility for the availability and possess the authority to organize, structure and coordinate availability execution matters. All other participants shall support the NSA/LMA in this regard. Accordingly, it is paramount that the NSA/LMA balance the needs of all participants and customers in the availability.

b. All participating activities shall provide all availability requirements (specifications, Automated Work Requests, major Planned Maintenance System and Ship's Force projects, approved installation drawings, schedule needs, system and compartment release dates, industrial support requirements, etc.) to the NSA/LMA as specified by other applicable milestones in this manual. Technical Points of Contact (TPOC) for each repair or installation activity shall also be provided to the NSA/LMA to assist with integrated planning questions. These TPOCs shall also be present during the execution of the availability and have authority to represent their organization's interest in matters relating to their repair

or installation. For Aegis ships, all Combat System upgrade packages shall be assembled, scheduled and integrated by the Aegis Combat System Project Engineer and submitted to the NSA/LMA as a package via the SEA21 Hull Manager.

(1) Alteration Installation Teams shall provide requirements in accordance with reference (a).

(2) The LMA shall develop an inclusive, detailed, integrated and resource-loaded schedule of all participating activities. All participants shall meet and review the proposed plan and make necessary adjustments to render a balanced and optimized integrated schedule. This formal schedule review shall occur after the WPIC, but no later than the Work Package Execution Review. The NSA/LMA shall serve as the final arbiter of conflicts. By the Work Package Execution Review, all integrated schedule conflicts shall be resolved by the NSA/LMA.

(3) The LMA shall be specifically tasked to accomplish integrated availability planning and execution. For Regional Maintenance Centers, the following related set of specifications achieving end-to-end integration shall be invoked in the availability Contract Line Item Number at a lead time commensurate with the complexity of the work package:

(a) "Availability Program Management Alteration Installation Team Integration" Standard Work Template 897-04 (Appendix ___).

(b) Combat Systems Light-off/AEGIS Light-off Compartment Release Schedule, SWT 813-01 (Appendix ___), as applicable.

(c) Propulsion Plant Light-off Assessment Standard Item(s), as applicable.

(d) Aegis Light-off NAVSEA Standard Item(s), as applicable.

NOTE: TASKING SHALL ENSURE THE NSA/LMA CAN PROVIDE INITIAL "SCHEDULE CONFLICT AWARENESS" AT THE WPIC.

c. Costs for this integration effort shall be prorated amongst the participating customers using existing, standardized proration conventions.

43.3 AVAILABILITY EXECUTION BUSINESS RULES.

a. During availability execution, the LMA shall manage and coordinate the project and recommend resolutions to conflicting issues. The NSA will exercise final arbitor for conflict resolution.

b. The LMA shall host weekly production progress and work review meetings. All activity participants shall ensure their TPOC is present to assist in coordination and conflict resolution.

c. LMAs also conduct daily production coordination meetings. It is recommended that all activity participants and TPOCs attend these on an as-needed basis to assist (in real-time) with coordination and conflict resolution.

d. In all availability meetings, communications and forums, a forward-looking, anticipatory focus should be applied by all parties to intercept potential problems and resolve them as soon as possible and with least cost and schedule impact.

VOLUME VI

CHAPTER 44

MAINTENANCE AND MODERNIZATION PERFORMANCE REVIEW MEETINGS FOR SURFACE FORCE SHIPS

LISTING OF APPENDICES.

A Access to Lessons Learned Conference Website on SURFOR Web

44.1 MISSION. The Maintenance and Modernization Performance Review (MMPR) is a forum for maintenance and modernization professionals to share, identify issues and focus on continuous process improvement in the Surface Navy. The MMPR provides a path for communication between the individual Project/Ship Lessons Learned Conference meetings and top-level maintenance and modernization leadership.

44.2 SCOPE. Topics will be relevant to process improvements for future availabilities and may include ship class or port specific process issues, best practices, success stories, industry feedback, technical issues, Surface Team One initiatives and new developments and Fiscal Year Availabilities.

44.3 ACTION ITEMS. All action items resulting from a MMPR conference will be tracked by Surface Team One and documented and tracked on the Surface Force (SURFOR) Website with Lessons Learned Conference Action Items and/or barriers. Documents from the MMPR will be posted to the MMPR website on the SURFOR Web at https://www.surfor.navy.mil/sites/st1. Instructions on gaining access to the SURFOR website are located in Appendix A.

44.4 FURTHER GUIDANCE. Further guidance regarding the MMPR process is outlined in the MMPR Business Rules.

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APPENDIX A

ACCESS TO LESSONS LEARNED CONFERENCE WEBSITE ON SURFOR WEB

1. Go to: http://www.register.surfor.navy.mil/default.aspx.
2. Click on: "Register for 'SURFOR Web' Account".
3. Fill in the information requested and submit.

***NMCI Users**: You are finished! You will soon receive an email with a username/password. The first time you log in to the site, you will need to use it. Thereafter, the website will refer to your CAC and you will not need to enter any information.*

Once you have an account, go to: https://www.surfor.navy.mil/sites/st1/llc

FOR NON-NMCI USERS

4. Follow steps 1-3 above. You will then be directed to the below screen.
    a. In the Command field, type in "NAVSEA".
    b. Select "contains" under the command field.
    c. Click "Search". This should bring up a drop down menu from which you can choose the most appropriate command.
    d. Once you select a command, click on "Lookup UIC".
    e. Click "Submit" at the bottom of the screen.
5. You will be directed to another page requesting additional information. When prompted, enter "Katherine Buckley" or "Inga Parvani" as your Point of Contact.
6. If you require further assistance, email surforweb@navy.mil.

You are finished! You will soon receive an email with a username/password.

Once you have a SURFOR Web account, go to: https://www.surfor.navy.mil/sites/st1/llc

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