DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
1333 ISAAC HULL AVE SE
WASHINGTON NAVY YARD DC 20376-0001

IN REPLY REFER TO
NAVSEAINST 4790.26A
Ser 04RM-4603/583
6 Mar 2019

NAVSEA INSTRUCTION 4790.26A

From: Commander, Naval Sea Systems Command

Subj: COMMON MAINTENANCE PLANNING WORKING GROUP

Ref: (a) OPNAVINST 4700.7L
(b) DoD Directive 4151.18
(c) SECNAVINST 5400.15C
(d) DoD Instruction 4151.22
(e) MIL-STD-3034A, Reliability-Centered Maintenance (RCM) Process
(f) NAVSEAINST 4790.27A
(g) NAVSEAINST 4790.8C
(h) NAVSEA S9081-AB-GIB-010, Reliability-Centered Maintenance (RCM) Handbook
(i) NAVSEA S9800-AB-MAN-010, NAVSEA Engineering and Technical Authority Manual (ETAM)
(j) Condition-Based Maintenance Plus DoD Guidebook

Encl: (1) Maintenance Planning–Engineering Analysis (MP-EA) Process Guide
(2) Fleet Maintenance Effectiveness Review (FLEETMER) Process Guide
(3) Classic Reliability-Centered Maintenance (RCM) Workshop Process Guide
(4) Common Alignment Maintenance Effectiveness Review (MER)
(5) Common Maintenance Planning Working Group (CMPWG) Organization
(6) Glossary of Terms and Acronyms

1. Purpose. This instruction designates the common maintenance planning working group (CMPWG) as the primary organization tasked with developing, promulgating, and sustaining processes, tools, and services used by those with responsibility for continuously improving maintenance requirements and maintenance requirement development processes to meet maintenance program goals and objectives established in references (a) and (b) over the in-service portion of Navy ship life cycles. This instruction sets policy and assigns responsibilities for the working group and the CMPWG Executive Committee (CMPWG EXCOM), defines goals and objectives, and identifies core processes. This instruction is a substantial revision and should be reviewed in its entirety.

2. Cancellation. NAVSEAINST 4790.26

3. Discussion

a. References (a) through (c) specify high-level responsibilities and actions associated with Department of Defense (DoD) and Department of the Navy (DON) maintenance. In particular, reference (a) notes Navy ship maintenance policies and actions are designed to ensure crew and ship safety while achieving desired operational readiness levels at the most economical total ownership cost, consistent with public law and other directives. Reference (b) directs that maintenance programs be adjusted periodically to improve maintenance agility, increase operational availability (Ao), and to reduce life-cycle total ownership costs. Reference (c) directs the Commander, Naval Sea Systems Command to oversee core processes required to support the acquisition, in-service support, and disposal of weapon and Information Technology systems including maintenance and modernization.

b. Reference (d) requires incorporation of CBM+ in appropriate policy guidance and directs that CBM+ be used as part of Reliability-Centered Maintenance (RCM)-based functional analysis formulated in a comprehensive reliability and maintainability engineering program. Reference (e) describes RCM methodology, and reference (f) establishes RCM policy and responsibilities within Naval Sea Systems Command (NAVSEA) including affiliated Program Executive Offices (PEO), Warfare Centers, and other Acquisition Managers. Reference (g) provides an overview for the development, management, and content of Class Maintenance Plans (CMP). Reference (h) is a tool for understanding and implementing RCM. Reference (i) provides information and guidance related to NAVSEA Engineering and Technical Authority; and reference (j) is a tool to assist logistics managers with CBM+ project development, implementation, and execution.

4. Applicability and Scope

a. This instruction applies to all Navy Weapons System programs; new weapons system procurements; Hull, Mechanical, and Electrical (HM&E) procurements; and all modernization programs under the cognizance of NAVSEA technical authority. It applies throughout the in-service life of all ships, ship systems, and equipment.

b. The Program Directors listed below are responsible for their respective systems that are not under the cognizance of NAVSEA technical authority and are therefore excluded from the scope of this instruction:

(1) The Director, Strategic Systems Programs (DIRSSP) is responsible for providing material support acquisition and fleet support of ballistic missile and strategic weapon systems, including missiles, platforms, associated equipment, and installation and direction of necessary supporting facilities. Nothing in this instruction detracts in any way from those responsibilities. Accordingly, DIRSSP will be consulted in all matters pertaining to, or affecting, strategic systems.

(2) The Director of the Naval Nuclear Propulsion Program (CNO (N00N)), which is also known as NAVSEA Code 08 (SEA 08), has responsibility for all matters pertaining to the maintenance, repair, and modification of naval nuclear propulsion plants and associated nuclear support facilities. Nothing in this instruction supersedes or changes these responsibilities and authorities. Accordingly, the Naval Nuclear Propulsion Directorate will be consulted in all matters pertaining to or affecting the maintenance, repair, or modification of naval nuclear propulsion plants or their associated nuclear support facilities.

c. The CMPWG Chair will coordinate and collaborate with DIRSSP and SEA 08 when warranted to assist with analysis of maintenance requirements and processes.

d. Development of CBM+ candidate technologies made ready for implementation in support of RCM applicable and effective maintenance requirements is the responsibility of the CBM+ Task Force.

5. Policy

a. The CMPWG is Commander, Naval Sea Systems Command's lead organization tasked with developing, issuing, and sustaining the tools and services used by those with responsibility for continuously improving CMP.

b. CMPs must include all Organizational-, Intermediate-, and Depot-level requirements (O, I, and D). CMPs will be developed and routinely reviewed to assure that ships can achieve operational and readiness goals while ensuring safety at the most economical total life-cycle cost over expected service life.

c. The working group will develop, issue and sustain core processes for effectively reviewing CMPs and CMP maintenance requirements. Core processes must include:

(1) Maintenance Planning–Engineering Analysis (MP-EA) Process. The MP-EA process identifies, prioritizes, and schedules ship systems and equipment for RCM engineering review and CBM+ candidate development and selects the most effective type of review. Ship systems and components will be evaluated for review based on maintenance execution and cost records, equipment readiness measures, Casualty Reports (CASREP), time since last review, and NAVSEA/Fleet/Board of Inspection and Survey (INSURV) inputs. The MP-EA process is described in detail in enclosure (1) of this instruction.

(2) Fleet Maintenance Effectiveness Review (FLEETMER) Process. FLEETMERs apply "Backfit" RCM methodology in a broad-based review conducted in a workshop environment to examine maintenance requirements for existing systems or equipment. Systems selected for FLEETMER, generally by the MP-EA process described above, may exhibit negative maintenance and reliability trends in execution, such as extra cost through the

introduction of unnecessary maintenance over time or the discovery of low reliability due to ineffective maintenance. FLEETMER is not appropriate for systems displaying completely unsatisfactory maintenance trends. The FLEETMER process is described in detail in enclosure (2) of this instruction.

(3) Classic RCM Workshop Process. Classic RCM Workshops apply Classic RCM per reference (e) on ship systems or components in a workshop environment. A Classic RCM Workshop consists of a narrowly focused engineered RCM review that dives deeply into the root causes of reliability or maintenance issues and is a suitable analysis tool for equipment displaying unsatisfactory maintenance and operational performance or systems without a maintenance plan. The Classic RCM Workshop is described in detail in enclosure (3) of this instruction.

(4) Common Alignment Maintenance Effectiveness Reviews (MER). These MERs are intended to address systemic maintenance problems that span the Navy enterprises and provide a flexible analysis framework for addressing difficult and persistent maintenance problems characterized by a lack of standardization in approach and/or a lack of basic understanding for the fundamental issues driving maintenance and maintenance requirements.

(5) CBM+ Process. CBM+ identifies the need for and proposes cost-effective Condition-Based Maintenance monitoring technologies to address maintenance issues. The CBM+ process is described in reference (f).

d. The goal of all CMPWG actions is to improve maintenance requirements, procedures, processes, and technologies to directly support the following objectives:

(1) Realize the most economical total life-cycle cost over the expected service life of the ship or weapon system.

(2) Achieve the required level of ship, weapon system, or component reliability, material, and operational availability.

(3) Ensure ship and personnel safety.

(4) Comply with all legal and regulatory requirements.

(5) Maximize commonality across similar equipment in similar service except where precluded by compelling cost, operational availability, or safety concerns.

(6) Satisfy the needs of work determination, inspections, certifications, and assist visits for use by all organizations providing or needing such services.

e. CMPWG changes to CMP requirements, technical procedures, or equipment design will be approved by the appropriate Technical Warrant Holder or Trusted Agent (TWH/TA) for a given system or component and forwarded to the appropriate Maintenance Planning Activity (MPA) (i.e., either Carrier Planning Activity (CPA); Submarine Maintenance Engineering, Planning, and Procurement (SUBMEPP); or Surface Maintenance Engineering Planning Program (SURFMEPP) for inclusion into the CMP. Unresolved Organizational-level changes will be documented as Technical Feedback Reports (TFBR), per reference (g), at the conclusion of CMPWG events. Intermediate- and Depot-level recommended changes will be documented and forwarded to the applicable Maintenance Planning Activity at the conclusion of CMPWG events via respective processes for inclusion in the Class Maintenance Plan. Recommendations for CBM+ solutions will be forwarded by NAVSEA letter to appropriate program offices and the CBM+ Task Force and briefed to the CMPWG EXCOM. Implementation of CMPWG changes to CMP requirements will be recorded as metrics in the CMPWG Annual Report.

f. The CMPWG must coordinate NAVSEA efforts to draft, review, and revise policy and processes dealing with development and sustainment of CMP maintenance requirements. The working group will develop or revise instructions, notices, or other documentation as required to institutionalize these strategies and practices. Policy and procedure changes will be documented by letter and assigned to established action groups such as the NAVSEA Life-Cycle Manager, Carrier Team One, Submarine Team One, Surface Team One, or other action groups. Review results and follow-on actions must be briefed to the EXCOM.

g. The CMPWG must examine maintenance planning and execution processes and instructions and make recommendations that ensure such instructions and processes support:

(1) Proper and efficient execution of CMP maintenance requirements.

(2) Conform to higher-level guidance per references (a) through (d).

(3) Support NAVSEA strategic objectives and achievement of operational readiness.

(4) Align with CNO goals for expected ship service life.

h. The CMPWG must stay apprised of relevant technological and scientific advances that address critical maintenance issues faced by the U.S. Navy. The CMPWG will conduct further investigation when such technologies show potential for reducing total life-cycle cost, improving operational readiness, and enhancing safety or legal and regulatory compliance of Navy shipboard equipment.

i. Activities of the CMPWG will be overseen by an EXCOM. EXCOM membership is extended to representatives from Naval Sea Systems Command Industrial Operations (SEA 04), Naval Sea Systems Engineering Directorate (SEA 05), Naval Sea Systems Command Acquisition and Commonality Directorate (SEA 06), Naval

Sea Systems Command Undersea Warfare (SEA 07), Program Executive Office (PEO), fleet, and other relevant activities identified by the EXCOM.

6. Reports. The CMPWG will produce the following work products resulting from the group's activities:

a. Annual Report detailing the efforts undertaken over the course of the year, including quantifying metrics associated with expected results of maintenance reviews. The report must describe the results of the MP-EA review, all FLEETMER events, all Classic RCM Workshops, and all ongoing or completed Common Alignment MER events.

b. Technical reports upon completion of Common Alignment MERs.

c. Results and metrics from all FLEETMER, RCM Workshop, and Common Alignment MER events.

d. Status updates to the EXCOM every 6 months.

e. NAVSEA letter forwarding the 3-year schedule of FLEETMER, RCM Workshop, and Common Alignment MER events developed through execution of the MP-EA process.

7. Responsibilities

a. SEA 04 will:

(1) Chair the CMPWG EXCOM.

(2) Assign primary billets for the CMPWG chair person.

(3) Designate and supervise appropriate staff within SEA 04 to support the working group and CBM+ Task Force.

(4) Establish qualification and certification requirements and provide RCM training for personnel participating in RCM Workshops and FLEETMERs.

b. CMPWG EXCOM will:

(1) Conduct EXCOM meetings semi-annually or as needed to oversee working group activities.

(2) Review and approve appropriate policy and process instructions.

(3) Ensure that the working group works closely with other relevant NAVSEA initiatives dealing with troubled systems.

(4) Coordinate with Fleet and Type Commander (TYCOM) N43 staffs to ensure waterfront concerns and issues are properly prioritized by the working group.

(5) Ensure CBM+ methodologies are integrated into CMPWG events and processes where practical.

(6) Serve as Navy wide advocates for working group activities.

c. SEA 05 will:

(1) Participate in the EXCOM and ensure that SEA 05 personnel support working group initiatives as appropriate.

(2) Designate a primary working group representative and point of contact for SEA 05 coordination.

(3) Ensure that SEA 05 and subordinate command TWH/TAs actively participate in appropriate CMPWG events.

(4) Ensure that TWH/TAs conform to CMP requirements development and modification policy.

d. SEA 06 will:

(1) Participate in the CMPWG EXCOM and ensure that SEA 06 personnel support CMPWG initiatives as appropriate.

(2) Designate a primary working group representative and point of contact for SEA 06 coordination.

(3) Communicate commonality initiatives to the EXCOM as appropriate.

e. PEOs will:

(1) Participate in the CMPWG EXCOM and ensure that PEO personnel support CMPWG initiatives as appropriate.

(2) Designate a primary CMPWG representative and point of contact for PEO coordination.

(3) Ensure that subordinate commands participate in appropriate working group events.

(4) Ensure that subordinate commands conform to CMP requirements development and modification policy.

f. CMPWG Chairperson (designated by SEA 04) will:

(1) Execute the day-to-day activities to achieve the objectives of the working group.

(2) Work closely with TYCOMs, N43 Staffs, and Regional Maintenance Centers (RMC) to ensure waterfront concerns and issues are properly prioritized by the working group, and to obtain operator and maintainer perspective at the deck-plate level during RCM events.

(3) Report periodically to the EXCOM on status and ability to execute working group events.

(4) Coordinate with other relevant NAVSEA initiatives.

(5) Generate the reports required by this instruction.

(6) Pass CMPWG message traffic to the EXCOM and other process participants.

(7) Execute responsibilities of MP-EA Team Lead for each MP-EA process cycle.

(8) Coordinate efforts to identify and prioritize systems using the MP-EA process.

(9) Develop the 3-year schedule, and execute FLEETMER, RCM Workshop, and Common Alignment MER events per the schedule.

(10) Coordinate development and/or modification of processes and procedures used by the CMPWG, including enclosures (1) through (4).

(11) Coordinate and provide input to the CBM+ Task Force as appropriate.

(12) Coordinate resources to execute working group responsibilities.

g. TWH/TAs will:

(1) Participate in CMPWG reviews of equipment covered under their technical warrant.

(2) Expeditiously and thoughtfully evaluate and judiciously implement working group recommendations.

(3) Make every effort to support review events. If the TWH/TA cannot attend, the review will be conducted and recommendations forwarded for their review, concurrence, and resolution.

h. Naval Sea Logistics Center (NAVSEALOGCEN or NSLC) and Maintenance Planning Activities, (i.e., CPA, SUBMEPP, and SURFMEPP) will:

(1) Participate in CMPWG meetings.

(2) Designate a primary working group representative to coordinate and plan activities.

(3) Actively assist the working group when reviewing planning activity cognizant equipment.

(4) Support FLEETMER, Classic RCM Workshops, Common Alignment MERs, and other CMPWG events, as applicable.

i. Responsibility for overall changes to the Common Maintenance Planning Working Group (CMPWG) organization structure and the Glossary of the Terms and Acronyms in enclosures (5) through (6) need to be coordinated through NAVSEA 04RM.

8. Records Management. Records created as a result of this instruction, regardless of media or format, must be managed per Secretary of the Navy (SECNAV) Manual 5210.1 of January 2012.

9. Review and Effective Date. Per OPNAVINST 5215.17A, SEA 04 will review this instruction annually on the anniversary of its effective date to ensure applicability, currency, and consistency with Federal, DoD, SECNAV, and Navy policy and statutory authority using OPNAV 5215/40 Review of Instruction. This instruction will automatically expire 5 years after its effective date unless reissued or cancelled prior to the 5-year anniversary date, or an extension has been granted.

T. J. MOORE

Releasability and distribution:
This instruction is cleared for public release and is available electronically only via the NAVSEA Public Web site located at http://www.navsea.navy.mil/Resources/Instructions/ .

MAINTENANCE PLANNING–ENGINEERING ANALYSIS (MP-EA) PROCESS GUIDE

1. Purpose. This guide describes the steps used to conduct a cycle of the MP-EA process. The goal of this process guide is to provide distinct procedures and guidance to ensure the intent of the process can be executed on a repeatable basis. Deviations from this process in order to make the process more efficient or to respond to changing waterfront maintenance concerns are warranted when necessary, but must be documented and justified in the CMPWG Annual Report.

2. MP-EA Overview

a. The MP-EA process examines recent component readiness, reliability, and cost in order to identify and prioritize worthwhile candidates for RCM analysis or CBM+ review based primarily on "Maintenance Burden." Worthwhile candidates for RCM analysis are those systems or components where RCM analysis of maintenance requirements and procedures is expected to result in improvements to safety, regulatory compliance, mission effectiveness, or lower total (including both corrective and preventive) maintenance costs over expected service life. Worthwhile candidates for CBM+ review are systems or components where dominant failure modes are known and clearly linked to a condition that can be monitored and for which a traditional RCM-based maintenance approach is delivering unsatisfactory results in terms of safety, availability, or economic goals.

b. The output of the MP-EA process is a schedule of systems selected for the various Maintenance Effectiveness Review processes (FLEETMER, Classic RCM Workshop, or Common Alignment MER) within specific time frames. This schedule should yield the best Return on Investment (ROI) from the limited funding available for application of RCM analysis. Additionally, the application of the MP-EA process improves the effectiveness of subsequent RCM analysis by focusing limited analytical resources where they provide the most benefit. The MP-EA process ensures that development of the RCM schedule reflects current maintenance priorities and that RCM schedule decisions are adequately justified and documented.

c. The MP-EA process consists of automated and semi-automated data mining techniques used on existing Navy maintenance data sources that were developed based upon the original SUBMEPP Activity MP-EA process. The MP-EA process includes a series of structured engineering and fleet waterfront stakeholder reviews. The end result of the MP-EA process is a prioritized list, based upon quantity and reported cost of maintenance of systems and components from the Carrier, Surface, and Submarine maintenance enterprises for RCM review, and a list of CBM+ development review candidates (if required) that will reflect the best ROI for limited RCM resources.

3. Preparation

a. Analysis Timeline. The time required from planning to execution of the MP-EA process is approximately 4 months. The actual dates for each analysis cycle are determined by the

CMPWG to align with available funding, budgeting, or other engineering resource allocation timelines, and to ensure resources are available when needed to support RCM analysis.

b. MP-EA Team. Prior to beginning the MP-EA process, a team of RCM-certified, experienced maintenance managers familiar with their respective Enterprise CMPs is assembled. MP-EA team members must have the ability to reach back into their parent enterprises in order to obtain resources required to complete the MP-EA tasking. The basic MP-EA membership will consist, at a minimum, of one representative from CPA, SUBMEPP, SURFMEPP, the NSLC Planned Maintenance System (PMS) Commodity Specialist community, NAVSEA Headquarters, and INSURV.

c. Initial Meeting and Development of MP-EA Team Schedule

(1) An initial planning meeting will be scheduled at the beginning of the MP-EA cycle. All members of the MP-EA Team will attend. The MP-EA Team Lead must ensure that adequate MP-EA process experts are available to perform initial data mining and assist with technical issues.

(2) At the initial meeting, the MP-EA process is reviewed. Lessons learned from previous MP-EA cycles are reviewed and addressed. All data sources are identified and discussed and all barriers that may complicate data gathering, data processing, and subsequent analysis are identified, documented, and addressed.

(3) The MP-EA Team builds an MP-EA cycle schedule adjusted for actual funding, budgeting, or other engineering resource allocation timelines. Any significant risks or obstacles to the execution of the MP-EA analysis timeline are identified and documented, along with corrective actions taken to mitigate or avoid these complications by cognizant authority as directed by the MP-EA Team.

4. Raw Data Assembly

a. Raw maintenance history data with reported maintenance cost is first queried from Ships' 3-M/ Open Architecture Retrieval System (OARS) database, for all components with reported actions for all applicable ship classes. The total number of 3-M "hits" over the past 5 years determines the total relative maintenance burden. The first 4.5 years of 3-M data corrective maintenance actions are also statistically compared to the last 6-month period in order to identify potential evolving reliability issues. The Mission Criticality Code (MCC) is considered when ranking the list of potential candidates to recognize the component's mission criticality.

b. A list of CASREPs for each ship class is reviewed and counted at both the system and component level. Troubled systems issues identified by senior management are collected by system or equipment. At this point the separate lists are integrated and 3-M maintenance cost information is added for all components.

c. A series of data queries in the 3-M/OARS system has been developed to automate this analysis.

d. Depot maintenance cost data (if available) must be gathered and organized at both the system and component level.

e. The MP-EA inputs are consolidated into a single document. Each data category (3-M total actions, CASREP count, recent deviation, cost per action, total cost) is ranked at the Expanded Ship Work Breakdown Structure (ESWBS) and Equipment Identification Code (EIC) level. These scores are converted into rank-ordered lists at the ship class level and total Navy level. An aggregate score for each ESWBS and EIC level is calculated. The MP-EA lists can be viewed or analyzed at the system or component level (and can be sequenced using any of the individual attributes), or at the aggregate level by ship class or total Navy level.

5. Initial Data Analysis and Report

a. The MP-EA Team conducts initial data analysis, and results are reviewed to ensure systems or components are aggregated at the right level to provide meaningful results that are actionable. Various aggregations are processed and reviewed iteratively to yield the best grouping of systems and components for effective RCM review. The following discussion of a hypothetical example illustrates this process:

(1) Maintenance data aggregated to the system level of the Ship's Service Turbine Generators might show up as high on the prioritized MP-EA list, but further analysis might reveal that the problems with this system are predominantly in two main components, air ejector condensers and governors.

(2) When comparing these results relative to other MP-EA items, the analyst can examine these components compared to similar components in other equipment (such as main condenser air-ejector condensers or Ship's Service and Emergency Diesel Generator governors) and can more accurately reprioritize the MP-EA output based on these revised groupings.

b. The output is an initial prioritized listing grouped by systems or components that reflect the best aggregation of problems for maximizing the effectiveness of subsequent RCM review efforts. From this list the MP-EA Team identifies both high and low maintenance-burden systems, identifies systems that are not good candidates for RCM review, and provides justification for those decisions. This list reflects initial MP-EA scores and results and includes preliminary recommendations for both cross-enterprise and enterprise-unique RCM reviews. The MP-EA Team reviews this list to identify worthwhile candidates for CBM+ analysis and documents justification. These lists are then developed by the MP-EA Team into a preliminary RCM schedule and candidate CBM+ analysis list.

c. The primary deliverable is an enterprise-specific ranked list of systems and components proposed for review, the approximate timeframes for when those systems should be reviewed,

and a list of candidate CBM+ systems and components for analysis including preliminary justification for inclusion in the list.

6. MP-EA Interim Schedule and Justification Data. The MP-EA Team prepares an interim Schedule and supporting data files to forward to the enterprise stakeholders prior to conducting the enterprise stakeholder reviews. Justification data must include the lists of MP-EA systems and associated MP-EA scores.

7. Enterprise Stakeholders Review

a. The MP-EA Team Lead briefs the preliminary RCM schedule to the enterprise stakeholders and forwards the preliminary RCM schedule, justification data, and CBM+ candidate list (where applicable) to appropriate organizations within the Carrier, Submarine, and Surface maintenance enterprises for review and comment. System experts with waterfront experience in planning and executing maintenance on the MP-EA components will evaluate the preliminary RCM schedule, rationale and justification data, and CBM+ candidate list (where applicable). Additional rationale uncovered during the Enterprise Stakeholder Review, not evident in the course of the MP-EA analysis, will be documented. Rationale will include but is not limited to:

(1) Qualified opinions and judgments of experienced marine engineers, maintainers, and system operators regarding adverse or positive trends

(2) Other programs and initiatives relevant to MP-EA identified systems and components

(3) Operational concerns and conditions that are impacting maintenance on MP-EA identified systems

(4) Connected systems that may be impacting system or component performance

(5) Related systems that may be exhibiting either similar or different issues

(6) Recent, in-progress, or pending modernization or replacement plans

(7) Results of recent material-condition assessments and post-repair condition reports

(8) Other factors influencing maintenance at the waterfront.

b. Stakeholders identify current and pressing maintenance issues that may be related to maintenance requirements. Such issues often generate suitable candidates for RCM analysis and may lead to suitable candidates for CBM+ analysis.

c. Stakeholders review and document associated comments and findings from the waterfront maintenance experts and overlay their recommendations as to suggested priorities for RCM review and appropriate justification for those recommendations.

d. Additional stakeholder inputs to the MP-EA process, consisting of recommended systems for analysis or improvement, are accepted by the CMPWG Chairman and CMPWG members on a continuous basis.

8. RCM Candidate List, CBM Plus (CBM+) Candidate List (as required), and RCM Review Schedule

a. Upon completion of waterfront review by enterprise stakeholders, the MP-EA Team reconvenes to review the stakeholder inputs. The MP-EA Team consolidates the inputs and identifies whether issues that were submitted are applicable across enterprises and how the preliminary RCM review schedule should best be modified to accommodate waterfront stakeholder review inputs. The final RCM schedule will include high-burden systems while considering low-burden systems that present meaningful opportunities for improvement. The MP-EA Team develops a list of related systems that could be grouped with the high-priority systems for more efficient RCM analysis. The resultant schedule should reflect current resources allocated for RCM analysis.

b. The group reviews the CBM+ candidate list in view of waterfront stakeholder review comments, vets this list with other programs that may have ongoing related efforts, and develops a final CBM+ analysis candidate list (as required).

9. RCM Schedule Letter. Following stakeholder review integration, the schedule is finalized and issued by SEA 04RM letter.

10. Lessons Learned Meeting

a. Following completion of the MP-EA process, the MP-EA Team holds a Lessons Learned meeting to generate recommendations for improvement to incorporate into future MP-EA analysis. For each topic addressed, the MP-EA Team documents problems discovered, determines the root cause of those problems, and recommends courses of action to address, fix, or improve those problems for future analysis.

b. Topics include, but are not limited to, data sources and data collection, system and component aggregation, MP-EA process steps, MP-EA and stakeholder team participants, MP-EA algorithms and reports, prioritization for RCM analysis, and resources.

FLEET MAINTENANCE EFFECTIVENESS REVIEW (FLEETMER) PROCESS GUIDE

1. Overview

a. The FLEETMER process applies "Backfit" RCM methodology in a broad-based review to examine maintenance requirements for existing systems. FLEETMER is the preferred analysis technique for reviewing maintenance requirements for systems that are exhibiting satisfactory or slightly substandard maintenance and reliability trends in execution, such as extra cost through the introduction of unnecessary maintenance over time, or the discovery of low reliability due to ineffective maintenance. Systems that are exhibiting unsatisfactory maintenance and reliability trends should also be considered for Classic RCM Workshop analysis.

b. The FLEETMER is a SEA 04-approved process that combines both the analytical work done in developing the original maintenance requirements and the operating experience gained since the maintenance program inception to investigate the applicability and effectiveness of planned maintenance tasks. Time-since-last-reviewed (TSLR) and MP-EA trends, as well as direct input for assistance from the fleet or the TWH/TA, are factored into the selection of systems for FLEETMER review.

c. FLEETMERs identify and recommend changes to maintenance requirements and procedures that assist in achieving: reduced total ownership costs, ship readiness objectives, ship safety standards, and legal or environmental compliance objectives. These results are achieved through application of RCM Backfit analysis. New maintenance requirements are added when the cost of the added maintenance is justified through decreases in expected total ownership cost, improvements in meeting ship readiness objectives, improvements to ship or crew safety, or improvements to ship compliance to legal or statutory requirements. Requirements and procedures are changed in order to improve RCM applicability and effectiveness. Requirements and procedural steps are eliminated when there is no evidence of age degradation, and where maintenance cannot be made RCM applicable and effective. RCM criteria are spelled out in greater detail in reference (e).

d. The maintenance requirement and maintenance procedure changes from a FLEETMER event should be approved by the appropriate TWH/TA during the event. Recommendations that require additional development or research and approved changes will be documented as TFBRs or other CMP change process documents.

(1) PMS actions generated from FLEETMERs must be acted upon by NSLC using the PMS process control described in reference (g). The goal for FLEETMER PMS change implementation is to have all PMS changes incorporated into the next regularly scheduled PMS Force Revision.

(2) I- and D-level maintenance changes must be acted upon by the appropriate MPA, using their documented procedures for review and possible inclusion in the CMP.

e. FLEETMER events review maintenance procedures to ensure that they are clear, concise, and correct.

f. FLEETMERs should generate assessment procedures with the objective of establishing Common Assessment Procedures (CAP) where appropriate. Recommended CAPs are documented by TFBR, or other CMP change process document, and assigned by NSLC to the respective TWH/TA for review and approval.

g. FLEETMERs may generate CBM+ candidates for further review and analysis.

2. FLEETMER Process

a. This guide describes how to execute the FLEETMER process. FLEETMER is a Lean process using Backfit RCM to efficiently analyze and update the entire maintenance plan for selected systems in a collaborative environment of maintenance stakeholders.

b. The FLEETMER process identifies gaps in maintenance requirements, modifies maintenance requirements to make them applicable and effective, and modifies procedures to improve accuracy, usability, and clarity. It incorporates best practices, where appropriate, and purges ineffective tasks and steps. HAZMAT, tag-out, and consumable requirements are also examined to reduce high cost or high risk actions and eliminate cumbersome work practices. CBM+ candidates may also be identified in the course of FLEETMER review. The FLEETMER process is designed to review Organizational (Shipboard), Intermediate, and Depot levels of Navy maintenance for submarines, carriers, and surface ships to compare maintenance actions of similar equipment across ship classes and types.

c. The RCM Backfit analysis process is documented in references (e) and (h).

3. Roles and Responsibilities

a. CMPWG Chairman:

(1) Is responsible for coordinating and executing MERs under approved processes and procedures and ensuring resources available are efficiently utilized.

(2) Ensures the TWH/TA participates in the MER and approves all appropriate and agreed-upon maintenance requirement changes.

(3) Ensures the proper technical experts, technical organizations, and shipboard Sailors for systems under review are identified and invited to MERs. Technical experts and organizations are not limited to System Commands (SYSCOM) and SYSCOM field personnel or activities, but can include other organizations such as Original Equipment Manufacturers, the Navy Safety Center, or inspecting and certifying organizations.

(4) Manages MER results and changes to ensure all changes are properly implemented.

(5) Ensures all changes affecting Nuclear Propulsion Plant Systems are forwarded to SEA 08 for concurrence, as stated in reference (g) (3-M Manual).

(6) Ensures all changes affecting Strategic Systems Programs are forwarded to DIRSSP for concurrence.

(7) Assigns appropriate personnel to the key roles of FLEETMER Project Coordinator, System Analyst, and Facilitator as described in subsequent paragraphs in this section.

(8) Ensures Regional Maintenance Centers and Shipyards provide technical expertise for Fleet maintenance issues including failure mode identification and validation, and Navy repair processes and best practices.

(9) Ensures Regional Maintenance Centers and Shipyards participate in the Community of Practice and attend the FLEETMER as required.

b. FLEETMER Project Coordinator:

(1) Coordinates the FLEETMER process and supervises system analysts and facilitators.

(2) Serves as the Point of Contact (POC) between the maintenance community and internal stakeholders.

c. FLEETMER System Analyst. This person is responsible for the complete analysis and data capture for the assigned systems, including the RCM review as directed by the system project plan.

d. FLEETMER Facilitator. During the FLEETMER, the Facilitator assists system Subject-Matter Experts (SME) including the TWH/TA in the RCM analysis and performs Quality Assurance (QA) checks.

e. TWH/TAs:

(1) Is warranted by the Navy to approve and disapprove changes to system maintenance requirements.

(2) Attends the FLEETMER as required and participates in the Community of Practice.

(3) Thoughtfully evaluates and implements appropriate FLEETMER recommended changes in a timely manner.

f. NSLC Commodity Specialists:

(1) Provide 3-M system technical expertise prior to and during a FLEETMER to assist analysis and scope determination.

(2) Provide logistical support for all changes resulting from the MER and ensure approved changes are incorporated into the PMS as quickly as possible.

(3) Process and forward TFBRs or other CMP change process documents resulting from the RCM analysis to the appropriate technical authority.

(4) Attend the FLEETMER as required and participate in the Community of Practice.

g. MPA System Engineers and System Specialists:

(1) Provide technical expertise prior to and during the FLEETMER in the area of off-ship maintenance requirements.

(2) Provide technical support to determine if the recommended changes should be included in the CMP.

(3) Attend the FLEETMER as required and participate in the Community of Practice.

h. Hull Planning Yard Representatives:

(1) Provide technical input and assist the System Analyst.

(2) Attend the FLEETMER as required and participate in the Community of Practice.

i. INSURV SMEs:

(1) Provide technical expertise for Fleet maintenance discrepancies and best practices.

(2) Attend FLEETMER as required and participate in the Community of Practice.

j. Fleet and Type Commanders (TYCOM):

(1) Provide shipboard experts for the systems scheduled for review.

(2) Attend the FLEETMER as required and participate in the Community of Practice.

k. Husbandry Agents

(1) Provide technical expertise for Fleet maintenance issues including Navy repair processes and best practices.

(2) Attend the FLEETMER as required and participate in the Community of Practice.

4. Procedures. Figure 1 is the flowchart for preparing and executing the FLEETMER process. Systems for FLEETMERs are selected through the use of the MP-EA process.

a. Scheduling. Systems selected for analysis will be scheduled for review at FLEETMERs with consideration given, but not limited to:

(1) Geographical location of Fleet concentration areas. FLEETMERs should be held whenever possible in close proximity to ships with the system(s) being analyzed.

(2) Availability of meeting facilities.

(3) Grouping of common systems where possible.

(4) Availability of Fleet representatives for reviewed systems.

b. Project Plan. The preparation and completion of a specific FLEETMER project plan will follow to the maximum extent practicable the baseline project plan. The specific project plan is developed by the FLEETMER project coordinator. It is designed to allow sufficient time for planning, preparation, performance, and follow-up. Deviations from the baseline project plan for a specific FLEETMER should be made to adjust for actual circumstances and must be documented and justified. The specific project plan for a FLEETMER will generally be aligned with the following notional timeline:

(1) Preparation: to begin 3 to 6 months prior to date of the RCM event

(2) Event Performance: 1week

(3) Follow-up:

(a) Post-event analysis and evaluation, 2 weeks

(b) Full implementation of results completed within 6 months to correspond with the PMS Force Revision.

FLEETMER Process Flow Chart

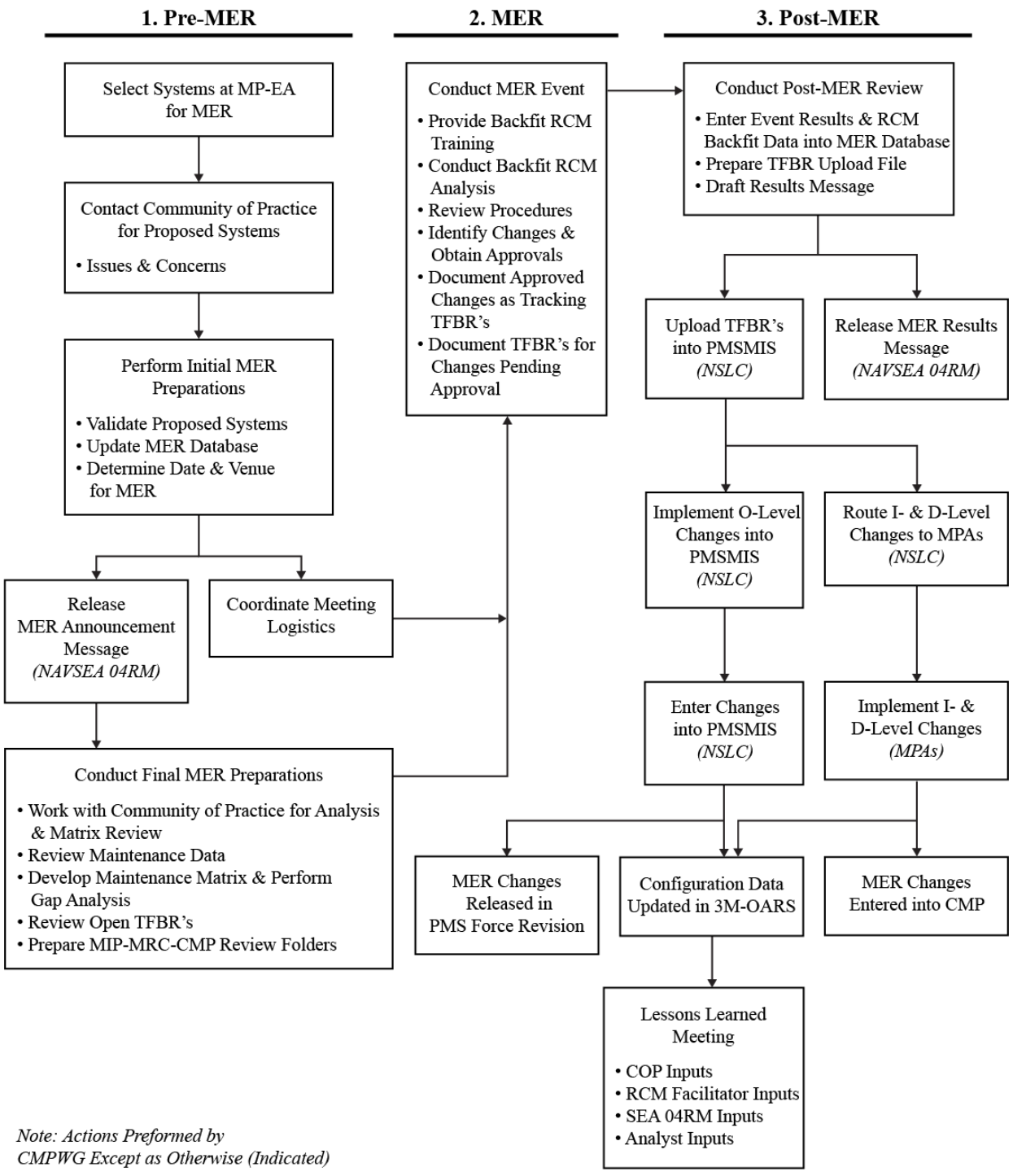

Figure 1. FLEETMER Process Flowchart

c. FLEETMER Preparations. Preparations consist of both a logistical and a technical component.

(1) Logistical Preparations

(a) Announcement Message. SEA 04RM will release a message announcing the upcoming FLEETMER to all stakeholders. At a minimum the message will contain: date, location, and schedule of RCM training and review; list of systems to be reviewed and the associated list of ship classes or hulls on which the equipment is found; request for TWH/TA, fleet, and Sailor participation; and points of contact.

(b) Meeting Location Logistics. The CMPWG Chairman will work with the FLEETMER project coordinator to make arrangements for the necessary conference facilities and to coordinate logistics for the meeting location.

(2) Technical Preparations

(a) System Preparation. The FLEETMER project coordinator will assign a lead analyst to each system scheduled for review. The lead analyst, with the assistance and guidance of the project coordinator and the Community of Practice, especially the TWH/TA, will develop a system-level plan for each system scheduled for review.

1. The project plan at the end of this chapter details the steps necessary for CAP development.

2. CAP development may require significant effort. The Community of Practice should modify steps specific to CAP development, where appropriate.

(b) Community of Practice. The Community of Practice consists of shipboard and shore maintenance experts, and the NAVSEA Technical Community who provide technical assistance in MER preparation, MER analysis, and post-MER evaluation of changes. FLEETMER participation should include the CMP engineer responsible for equipment requirements, Naval and/or commercial shipyard and RMC experts, maintenance team members, planning yard systems engineers, and other relevant personnel. These personnel are identified early in the process and are expected to participate in preparations for the MER event (when appropriate), and any post-event work such as procedure development or ship-checks of changed requirements and/or procedures. Community of Practice members should be selected from commands with the appropriate equipment and expertise. They should be identified by name and command and will correspond as required prior to the FLEETMER.

(c) Common Functional Block Diagram (CFBD). The lead system analyst and the Community of Practice should construct a CFBD of the system. The CFBD is not designed to be a schematic but instead is a high-level functional representation of the system scheduled for review. Where possible, the block diagram should be created for all “common” systems (i.e., a single block diagram applies across all system or ship classes that have a similar function).

Where a single common diagram is not possible, differences should either be noted on the single diagram or separate diagrams should be produced. The creation of a CFBD enables the Community of Practice to analyze and make decisions related to the structure of the maintenance program for the system(s) being reviewed. The TWH/TA will approve the final CFBD. Some of the questions that can be addressed by the CFBD include:

1. Do the boundaries, defined by the CFBD, contain all maintenance items expected to be reviewed during the FLEETMER process?

2. Are all the failure modes of concern for this system contained within the boundaries?

3. Do all participants agree on the limits of the expected maintenance review?

4. Are the various system types and implementation across classes similar enough that a common maintenance approach can be used on all types, simplifying the development, upkeep, and performance of the maintenance program?

5. Where differences exist, what variations in the maintenance program need to be made to account for them?

(d) Configuration/Maintenance Figure of Merit (mFOM) data (as required). The lead system analyst and Community of Practice will retrieve and compile available mFOM structures and configuration data for all ship classes that contain the system. The mFOM/Configuration data will be compared to the CFBD to ensure all major configuration items are contained within the analysis boundary defined by the CFBD. The mFOM/Configuration data together with the CFBD are helpful in determining when common procedures can be implemented or when configuration differences require procedure variation.

(e) Technical Documentation. The Community of Practice will identify and compile any required technical data to include (but not limited to):

1. CMP and PMS maintenance requirements, tasks, and procedures

2. Relevant shipyard pre- and post-repair test procedures

3. INSURV, TYCOM, or other Naval activity checklists

4. Inspection criterion and procedures

5. Certification criterion and procedures

6. Assessment and troubleshooting guides

7. Incident or safety reports and recommendations

8. Operating procedures

9. Temporary operations or maintenance guidance

10. Original Equipment Manufacturer (OEM) manuals, Navy equipment technical manuals, and Naval Ships' Technical Manuals (NSTM)

11. Industry best practices

12. Outstanding TFBRs or other CMP change process documents and CASREPs

13. CBM+ systems targeting studied or similar systems in use or development by the U.S. Navy or in commercial service.

(f) Operating Procedures. The Community of Practice should compile and review Operating Procedures to ensure alignment with PMS and CMP requirements, mFOM, and configuration data. The review of operational procedures should specifically look for where maintenance requirements or procedures are duplicated by operational requirements or procedures. The Community of Practice will flag all areas where there are duplicative requirements and develop initial recommendations as to how duplicative requirements should be resolved.

(g) Maintenance History. The Community of Practice should compile and review maintenance history information including 3-M and CASREP data. Most of this data is available as part of the MP-EA process. Additional sources of information may be available, such as historical analyses from Naval Surface Warfare Center (NSWC) Corona for C4I and combat systems. Information is analyzed to identify high maintenance drivers and to determine failure modes. The failure modes identified for each component are compared against existing maintenance to assist in the identification of gaps in PMS and CMP requirements. Failure history can also be used to identify the need for changes to existing maintenance requirements to reduce the number or frequency of failures and the potential need for and suitability of CBM+ analysis.

(h) Commercial Best Practices. Where appropriate, the Community of Practice will compile and review non-Navy (e.g., United States Coast Guard (USCG), American Bureau of Shipping (ABS), commercial, and other DoD) applications of the system to determine if any industry best practices should be adopted.

(i) Maintenance Matrix. Each system analyst develops a matrix containing all maintenance tasks (PMS, CMP, assessments, inspections, certifications, etc.) currently associated with the system. The matrix is used to sort similar tasks based on similarity of action with a sub-sort by periodicity and ship class applicability. The matrix is a tool used to generate a broader understanding of the maintenance program associated with a particular system. Where appropriate, non-Navy maintenance tasks may also be shown in the matrix for comparison and

evaluation purposes. Figure 2 below provides an example maintenance matrix. Use of the matrix can help the analyst identify:

1. Failure modes and effects and how they map to specific maintenance tasks.

2. Inconsistencies in maintenance plans for similar equipment across different ship classes or similar systems in the same class. Such inconsistencies could indicate possible need for maintenance additions, subtractions, or realignments for certain ship classes or systems.

MIP	SystemName	MRC	Periodicity	Equipment	Component	Task	Sort Number	Task Description	CG	DDG	LCS	LHA	LHD	LPD 17	LSD	CVN 68	CVN 78	SSN 21	SSN 688	SSN 774
5733/006-22	Below Deck Cargo Handling Equipment	6VAB	S-6	Monorail	Switches, Limit; Switches, Track	Clean, Inspect, Lubricate	A.9	Inspect and Lubricate Track Switch(es); Clean, Inspect, and Lubricate Limit Switches.					X							
5733/006-22	Below Deck Cargo Handling Equipment	8KCQ	R-4	Monorail	Oil	Sample	A.13	Provide Lubricating Oil Sample for Spectrographic, Physical, and Chemical Analysis.					X							
5733/006-22	Below Deck Cargo Handling Equipment	8KCR	S-19	Monorail	Gearbox, Oil Level	Inspect	A.20	Inspect Oil Levels On Hoist Car Gearbox.					X							
5733/006-22	Below Deck Cargo Handling Equipment	8KCT	A-3	Monorail	Brake, Parking	Inspect	A.27	Inspect Parking Brake.					X							
5845/002-C1	Landing Craft In Haul Systems	1CJ3	R-1	Winch	Winch, Assy	Operational Test	B.14	Perform Operational Test of Vehicle Recovery Winch.					X	X						
5845/002-C1	Landing Craft In Haul Systems	2BE7	A-2	Winch	Brake, Electric	Clean, Inspect	B.2	Clean and inspect Electric Brake Assembly.					X	X						
5845/002-C1	Landing Craft In Haul Systems	8HMP	S-1	Winch	Motor Controller	Clean, Inspect	B.11	Clean and inspect winch motor controller.					X	X						
5892/001-72	Cranes And Hoists	1AU1	A-10	Crane	Components	Inspect	C.9	Inspect Crane Components.							X					
5892/001-72	Cranes And Hoists	1AV7	48M-1R	Crane	Crane	Weight Test	C.14	Load Test Crane.							X					
5892/001-72	Cranes And Hoists	6UPV	R-3	Crane	Reservoir, Oil	Inspect	C.25	Inspect Gantry and Trolley Oiler Reservoir Levels.							X					
A-203/048-42	Bridge And Traveling Crane	1NN5	48M-1R	Crane	Crane	Weight Test	C.14	Conduct Crane Certification Weight Test.				X								

Figure 2. Example Maintenance Matrix

3. Duplication of effort among various PMS, CMP, assessment, or other tasks where better alignment of resources may be possible

4. Potential gaps in maintenance as evidenced by failure modes identified by INSURV results or other maintenance history where the generation of new applicable and effective maintenance tasks can improve reliability and availability

5. Best practices that may exist in a particular system, ship class, or industry that can be adopted for similar systems to improve system reliability or availability, or improve accomplishment methodology.

6. Areas where CBM+ enabling technologies can be applied or extended if warranted.

(j) FLEETMER Database

1. The database contains the most up-to-date information relating to all tasks currently associated with the system including task descriptions, periodicity or frequency, and man-hours.

2. The database generates forms for review and detailed documentation of RCM Backfit analysis and justification of any modification to tasks and procedures.

3. During or immediately following the FLEETMER analysis event, the data collected on the documentation forms is entered into the database for use as outlined in the Post-FLEETMER Activities topic (paragraph 4f). Following the completion of the FLEETMER, the data from the FLEETMER database is retained as a historical record within the Planned Maintenance System Management Information System (PMSMIS).

(k) Review Materials

1. All materials generated by the Community of Practice during the preparation phase (including the maintenance matrix and any technical documentation), barring any classification or other distribution limitations, will be made available as soon as possible via a secure Internet portal.

2. All materials required for review of the selected maintenance tasks at the FLEETMER event (e.g., Maintenance Index Pages (MIP), Maintenance Requirement Cards (MRC), CMP Tasks, documentation forms, technical materials, etc.) will be assembled and delivered to the FLEETMER location.

d. FLEETMER Performance (Analysis Event). The FLEETMER event is 1 week in duration and includes 1.5 days of NAVSEA Backfit RCM Certification training. RCM Certification training is followed by a facilitated review of the scheduled systems maintenance program.

(1) Backfit RCM Certification Training

(a) Backfit RCM Certification issued by NAVSEA is required by reference (e) for all In-Service Engineering Agents (ISEA), Commodity Specialists, and others who review, modify, plan, or approve changes to existing approved maintenance tasks.

(b) An approved course of instruction and examination for certification in Backfit RCM is available during the first day and second morning (or only first day in some instances) of the FLEETMER event by NAVSEA-certified RCM instructors.

(c) Personnel who have a current Backfit RCM Certification are not required to attend the FLEETMER RCM training class, but may attend for refresher training or to gain

proficiency. SEA 04RM regularly offers RCM training and certification outside of the FLEETMER process.

(2) Analysis Overview

(a) The participants review their respective maintenance requirements using the Backfit RCM methodology. Certified trainers and facilitators assist the participants in the FLEETMER analyses. Each facilitator has significant experience with Navy maintenance, PMS, and CMPs. Facilitators are available to answer questions about the FLEETMER process and assist TWHs/TAs and other participants in arriving at appropriate RCM-based decisions. After the technical warranted or delegated authority completes the review of respective maintenance requirements, the facilitators perform a quality assurance check. (Note: The TWH/TA must make every effort to support review events. If a representative does not show for the event, the review will proceed as planned and recommendations will be forwarded for review and resolution. Where sufficient time is available in which it is known that the TWH/TA will not be able to attend, the review will be rescheduled.)

(b) Facilitators will remain with the technical warranted or delegated authority until all maintenance requirements scheduled for review are complete. Sufficient analysis will be performed prior to the FLEETMER event to ensure a meaningful review and discussion during the FLEETMER.

(c) No change will be made without the technical warranted or delegated authority approval and signature for all maintenance changes.

(3) Analysis Details and Improvement Methods. The following actions will be completed during a FLEETMER under the specific system project plan:

(a) Perform Backfit RCM Analysis on all requirements.

1. Tasks are validated for *applicability* and *effectiveness* and may be modified to incorporate best practices. Tasks that are not applicable and effective are either deleted or modified to make the task applicable and effective. RCM validation includes clearly defining all dominant failure modes and effects including any specific economic, safety, or mission-impacting concerns and operational limitations.

2. The Backfit RCM form contained in reference (e) is used to complete the RCM analysis on all existing or draft requirements addressed on the spreadsheet, and any new tasks identified from the subsequent steps.

(b) Evaluate Maintenance Matrix including all certification and inspection requirements for the following:

1. Determine degree of commonality. If items are common, the tasks or requirements should also be common or have documented legitimate rationale for the differences

(i.e., “common where practical”). This rationale should be listed on the RCM form for the applicable maintenance requirement. If sufficient information cannot be obtained to resolve the issue, submit a TFBR or other change process document against the task requesting resolution.

2. Determine duplicative requirements (same procedure invoked under different periodicities or criterion). Review the spreadsheet developed for requirements or tasks that address the same failure modes under different tasks or requirements. The duplicative requirement is to be resolved by the technical warranted or delegated authority at the FLEETMER, and rationale documented on associated RCM form(s). If unable to resolve, a TFBR or other change process document must be submitted addressing the issue.

3. Align tasks to requirements. Using the Maintenance Matrix, ensure all maintenance, inspection, and certification tasks are aligned to an applicable and effective maintenance requirement in the Maintenance Plan. If no applicable maintenance requirement exists, go to the next step.

4. Determine missing, misaligned, or ineffective tasks. If the data or information provided identifies the need for additional tasks or requirements, outline the requirements and complete the Backfit RCM analysis to validate the task.

(c) Review operating procedures to ensure they align with the maintenance requirements. If a new maintenance procedure is developed during the MER, a TFBR or other change process document will be submitted to track completion of the new requirement, task, or procedure, or for recommended changes to the operating procedure(s).

(d) Consider the use of CBM+ enabling technologies. Consider CBM+ where existing or proposed maintenance requirements will not satisfy safety, compliance, and operational goals. CBM+ enabling technologies may also be considered when there is a reasonable likelihood they will reduce total ownership cost.

(e) Create a CAP Development List. All tasks identified by certification requirements should be addressed by an applicable and effective maintenance task. If none exists or is insufficient, then a CAP should be outlined. The CAP may be used to consolidate existing assessments in the maintenance plan by referencing the appropriate MRC(s). The CAP should ensure that all inspection, audit, and certification requirements are addressed and standardized. Where possible, the outline will utilize existing procedures noting required modifications, additions, and deletions.

(4) Documentation. Documentation includes all RCM analysis results and decisions including failure modes, applicability, and effectiveness including justification for benefits (i.e., safety, environmental/regulatory, operational, or economic) and any proposed changes to procedure, schedule, level of performance, scope, etc.

(a) Justification should compare the estimated dollar cost of performing the maintenance to the estimated cost of not doing the maintenance, in terms of dollar cost of

resultant corrective maintenance, change in Ao, safety improvements or degradations, and specific ability or inability to comply with regulatory or statutory requirements.

(b) All results will be entered into the FLEETMER database during the FLEETMER or during the post-MER period to enable tracking of results and implementation of changes, and to provide a ready historical archive for future FLEETMER planning and performance and for long-term evaluation of changes to the maintenance program.

(5) Approvals. All recommended changes from the FLEETMER will be approved by signature of the technical warranted or delegated technical authority in attendance. Requirements that need additional action such as further research or development, or require review and concurrence from parties not at the FLEETMER event (such as SEA 08 cognizant items), will be submitted as TFBRs or other CMP change process documents per reference (g), to document required actions and track accomplishment.

e. FLEETMER Event Feedback. At the conclusion of the FLEETMER event, feedback will be solicited from all participants. Feedback pertaining to RCM training curriculum will be forwarded to the NAVSEA RCM training team for action. Feedback pertaining to the FLEETMER process will be reviewed and evaluated for process improvement during the post-FLEETMER Lessons Learned session described in paragraph 4f(6)(c).

f. Post-FLEETMER Activities

(1) FLEETMER Maintenance Changes. All modifications including any additions or deletions made to the respective systems during the FLEETMER event will be documented and tracked for implementation in the following manner:

(a) Changes approved by the TWH/TA at the FLEETMER will be forwarded to NSLC for implementation into the PMS Force Revision, and to the MPAs for review and possible inclusion into the CMP.

(b) For any proposed changes that require further research or development, and therefore cannot be completed at the FLEETMER, a TFBR or other change process document will be entered and forwarded to the appropriate ISEA via the Commodity Specialist for tracking to completion. The assigned TFBR tracking number will be entered into the FLEETMER database. (Note: The respective MPA must be made aware of recommended changes to the CMP. The FLEETMER database will be updated with the final disposition of assigned TFBRs or other CMP change process documents.)

(c) If the recommended change is beyond the scope of authority of the technical warranted or delegated authority, such as those affecting nuclear propulsion plants, a TFBR or other change process document will be generated to document the need for additional review and track accomplishment. The assigned TFBR tracking number will be entered in the FLEETMER database.

(2) FLEETMER Event Completion Metrics. These will include:

(a) MRCs reviewed

(b) MRCs changed

(c) MRC procedures changed

(d) MRC periodicities changed

(e) MRCs deleted

(f) MRCs added

(g) MRCs changed and approved at event

(h) CMP I- and D-level tasks reviewed

(i) CMP I- and D-level tasks changed

(j) CMP I- and D-level periodicities changed

(k) CMP I- and D-level tasks deleted

(l) CMP I- and D-level tasks added

(m) TFBRs answered

(n) TFBRs generated (estimated)

(o) HAZMAT items modified

(p) Tools, Parts, Materials, and Test Equipment (TPMTE) items modified

(q) Fleet parts and materials reduced per year (items)

(r) Fleet maintenance-hours per year reduced

(s) Cost avoidance from answered TFBRs (one time)

(t) O-Level equivalent cost avoidance per year

(u) I- and D-Level corrective cost decrease per year

(v) Savings for parts and materials reduction per year

(w) Energy use cost avoidance per year

(x) Total projected recurring cost avoidance per year

(3) Cost Avoidance. Cost Avoidance will be quantified in cases where a maintenance change reduces failures based on existing failure data. When cost avoidance is not quantifiable, no cost impact is provided. A narrative should be provided to quantify changes in Ao, describe changes to safety levels, and list specific abilities to comply with regulatory or statutory requirements.

(4) FLEETMER Results Message

(a) SEA 04RM reports to leadership the overall FLEETMER results by Naval message within 30 days of the completion of the MER. This message includes a list of participants, FLEETMER metrics as noted in paragraph 4f(2), outstanding follow-on actions, and specific maintenance plan improvements.

(b) A technical change summary containing the following will be provided to the TWH/TA and system technical stakeholders:

1. A list of maintenance changes made and approved by the TWH/TA during the FLEETMER

2. A list of recommended maintenance changes, by TFBR or other change process document, that require further review and approval by the TWH/TA or require concurrent approvals from other organizations such as SEA 08

3. A list of maintenance changes as documented by TFBR or other change process document that require further development (e.g., new MRCs).

(5) Implementation of FLEETMER Changes

(a) The completed Backfit RCM forms, change documentation forms, and database are forwarded to the NSLC for implementation. Changes requiring further review or development, as documented by TFBR or other change process document, will be forwarded to the appropriate stakeholders for action.

(b) MER changes to MRCs are entered into the PMSMIS and then issued in conjunction with the release of the PMS Force Revision. MER recommended changes to I- or D-level Class Maintenance Plan tasks may result in inclusion or creation of new Class Maintenance Plan tasks as determined by the cognizant MPA.

(c) CBM+ recommendations will be documented by Naval letter to the appropriate Program Office and the CBM+ Task Force.

(6) FLEETMER Lessons Learned

(a) A Lessons Learned meeting will be coordinated following each FLEETMER to identify strengths and weaknesses of the process. This review is intended to guide and improve future FLEETMERs.

(b) Recommendations and feedback will be solicited from all FLEETMER participants and stakeholders including (but not limited to) ISEAs, Fleet Representatives, Facilitators, and NSLC Commodity Specialists.

(c) Recommendations and proposed changes will be reviewed by FLEETMER stakeholders at a formal Lessons Learned meeting held annually. Required participants will include, as a minimum, SEA 04RM, CMPWG members, and FLEETMER project personnel.

(d) As necessary, incorporation of Lessons Learned will be published as changes to this document.

(7) Implementation Status Reports. The CMPWG prepares and distributes, via e-mail, periodic reports to the event participants and other stakeholders to communicate a full implementation status of the approved change recommendations and those remaining to be implemented. The reports are prepared at 6-month intervals and continue until either the implementation reaches the 2-year mark or when the implementation is over 95 percent complete for the combined systems.

(8) Five-Year Effectiveness Reviews. This review is done as a measure of program effectiveness. The CMPWG analyzes the effectiveness of the FLEETMER event changes over the 5 years subsequent to the event. This data is compared to the 5 years of data prior to the FLEETMER event. Analysis to identify trends, causal relationships, and benefit calculations is performed. The completed report is issued as an appendix to the CMPWG Annual Report.

CLASSIC RELIABILITY-CENTERED MAINTENANCE (RCM) WORKSHOP PROCESS GUIDE

1. Overview

a. The RCM Workshop process applies “Classic” RCM methodology in a narrowly focused review to develop maintenance requirements for a system. Classic RCM is the preferred analysis technique for developing maintenance requirements for selected systems that exhibit unsatisfactory maintenance and reliability trends in execution, such as extra cost through the introduction of unnecessary maintenance over time or the discovery of low reliability due to ineffective maintenance. Existing maintenance requirements for systems that exhibit satisfactory maintenance and reliability trends should be considered for RCM Backfit analysis using the FLEETMER process.

b. The CMPWG Chairman oversees Classic RCM Workshop events. SUBMEPP CMP or RCM personnel are designated to coordinate and execute classic RCM Workshops for the CMPWG. During an RCM Workshop, SUBMEPP RCM personnel facilitate completion of Classic RCM analysis utilizing a step-by-step Classic RCM approach. The Classic RCM process utilized by SUBMEPP personnel is compliant with MIL-STD-3034A. TSLs and MP-EA trends as well as direct input for assistance from fleet or TWH/TA are factored into the selection of systems for RCM Workshop review.

c. Classic RCM Workshops evaluate the system to identify the critical functions and failure modes. Applicable and effective maintenance is recommended to reduce or mitigate risk with critical failure modes.

(1) These recommendations result in the basis for new maintenance requirements or changes to existing maintenance requirements. Alterative maintenance or modifications to existing procedures may also be recommended. Additional recommendations are documented resulting from the RCM Workshop discussions to improve maintenance scheduling, procedures, supply, or technical documentation.

(2) SUBMEPP personnel facilitate and mentor the process during the workshop to assure the requirements of MIL-STD-3034A and NAVSEA's certified RCM process are satisfied. This process may be used to develop an initial set of maintenance requirements for new systems, or may be used to analyze and re-develop maintenance for in-service systems with an existing CMP.

(3) RCM Workshops develop maintenance requirements and procedures to achieve the lowest total ownership cost, assist in achieving ship readiness objectives, and/or assist in meeting ship safety standards and legal and environmental compliance objectives. New maintenance requirements are developed when the cost of the added maintenance is justified by reduced total ownership cost and/or improved ship readiness, safety, and compliance to legal or statutory requirements. Requirements and procedural steps are not required when there is no evidence of

age degradation, and where maintenance cannot be made RCM applicable and effective. RCM criteria are spelled out in greater detail in reference (e).

d. The new or changed maintenance requirements will, to the maximum extent possible, be approved by the appropriate TWH/TA during the event. Recommendations that require additional development or research must be documented as TFBRs or other CMP change process documents, and assigned as either PMS or CMP actions, as applicable.

(1) PMS changes generated from workshops must be implemented expeditiously by NSLC using the PMS process control described in reference (g) (3-M Manual). The goal for RCM Workshop implementation is to have any PMS changes ready for use in the PMS system no later than ship or system acceptance. For existing in-service systems, changes to PMS should be incorporated into the next scheduled PMS Force Revision.

(2) CMP maintenance requirement changes must be reviewed for possible implementation by the appropriate MPA using its documented procedures in coordination with the system TWH/TA.

e. RCM Workshops may generate candidate CBM+ systems or components for further review and analysis.

2. RCM Workshop Process

a. This guide describes how to execute the RCM Workshop process. RCM Workshops use RCM to efficiently analyze the system to develop a complete maintenance plan for Depot, Intermediate, and Organizational maintenance echelons in a collaborative environment of maintenance stakeholders. RCM provides a structured approach to design and review the maintenance program and ensures every maintenance task meets basic criteria. The basic criteria are summarized as follows:

(1) Only maintenance that preserves required functionality should be performed. Actions that do not preserve required functions are wasteful and should be eliminated.

(2) Tasks should be designed to address well defined and understood problems. A poor understanding of the problem results in tasks that are poorly focused, fail to address the problem of concern, and waste resources.

(3) Tasks that are developed must prevent, discover, or reduce the impact of a failure mode by restoring or maintaining the inherent component, equipment, subsystem, or system reliability (RCM rule of “applicable”). A task is determined to be “applicable” if it satisfies all the rules for its task type, (i.e., condition-directed, time-directed, failure-finding, servicing, and lubrication). Inherent reliability thresholds may not always be measured or established, and when they are, they must be defined by the appropriate technical authority.

(4) The benefits of performing the maintenance task (less the cost to accomplish the maintenance task) must exceed the cost of non-performance (RCM rule of "effective"). The rule of effectiveness includes risk evaluation and management for safety, regulatory and environmental, and operational concerns as well as economic impacts and benefits.

b. The RCM Workshop process identifies maintenance requirements and develops tasks that are applicable and effective and meet the principles of RCM. The RCM Workshop process typically does not develop detailed procedures, but may identify relevant procedures from OEM recommendations or existing Navy procedures for similar tasks that can be used as a starting point for developing the system-specific procedures during the post-RCM Workshop period. Worthwhile CBM+ candidate systems or components may also be identified in the course of the RCM Workshop review. The RCM Workshop process is designed to:

(1) Develop Organizational, Intermediate, and Depot levels of Navy maintenance for submarines, carriers, and surface ships and, where appropriate, to consider maintenance actions for similar equipment across ship classes and types.

(2) Identify recommendations related to system testing, logistic support, technical documentation, or alterative maintenance.

c. Classic RCM analysis methodology is documented in references (e) and (h).

3. Roles and Responsibilities

a. CMPWG Chairman:

(1) Oversees overall RCM Workshop execution and performance. SUBMEPP CMP or RCM personnel are designated to coordinate and execute Classic RCM Workshops for the CMPWG.

(2) Assigns appropriate personnel to the key role of RCM Workshop Program Coordinator, which is described in paragraph 3b (RCM Workshop Program Coordinator).

(3) Ensures proper support from participating activities is provided.

(4) Ensures notification of RCM Workshop events is properly distributed.

b. RCM Workshop Program Coordinator:

(1) Coordinates the RCM Workshop process and supervises system analysts and facilitators.

(2) Serves as the POC between the maintenance community and internal stakeholders.

(3) Coordinates RCM Workshops under approved processes and procedures and ensures resources are efficiently utilized for developing, reviewing, and improving maintenance.

(4) Ensures the TWH/TA participates in RCM Workshops and approves all appropriate and agreed-upon maintenance requirement changes.

(5) Ensures the proper technical experts and technical organizations for systems under review are identified and invited to RCM Workshops. Technical experts and organizations are not limited to SYSCOMs and SYSCOM field personnel or activities, but can include other organizations (such as Original Equipment Manufacturers, the Navy Safety Center, or inspecting and certifying organizations).

(6) Manages RCM Workshop results and changes to ensure proper implementation.

(7) Ensures all requirements affecting Nuclear Propulsion Plant Systems are forwarded to SEA 08 for concurrence, as stated in reference (g) (3-M Manual).

(8) Ensures all changes affecting Strategic Systems Programs are forwarded to DIRSSP for concurrence.

(9) Assigns appropriate personnel to the key role of RCM Workshop Facilitator.

(10) Ensures Regional Maintenance Centers and Shipyards provide technical expertise for fleet maintenance issues including failure mode identification and validation, and Navy repair processes and best practices.

(11) Ensures Regional Maintenance Centers and Shipyards participate in the Community of Practice and attend the RCM Workshop as required.

c. RCM Workshop Facilitators:

(1) Perform analysis and data capture for the assigned systems, including the RCM analysis as directed by the system project plan.

(2) Send notification of the RCM Workshop event to applicable activities and personnel and coordinate applicable support details.

(3) Provide presentation of RCM Overview and RCM Workshop process to participants.

(4) Capture pertinent data for the Classic RCM analysis, including rational into the SUBMEPP Enterprise RCM application.

(5) Assist system subject-matter experts and the TWH/TA in the RCM analysis during the RCM Workshop and perform quality assurance checks.

(6) Review RCM Workshop-generated Classic RCM analyses for completeness and complete quality assurance check prior to analysis archival.

(7) Distribute RCM Workshop event-generated Classic RCM results and recorded action item recommendations to RCM Workshop attendees and other applicable personnel.

(8) Generate and submit PMS and CMP maintenance requirement change recommendations by TFBR or other CMP change process documents to NSLC for O-level and to MPAs for I- and D-level.

d. TWH or TA:

(1) Approves and disapproves changes to system maintenance requirements.

(2) Participates in the Community of Practice.

(3) Evaluates and implements appropriate RCM Workshop recommended changes in a timely manner.

e. NSLC Commodity Specialists:

(1) Provide 3-M system technical expertise to system analysts prior to and during the RCM Workshop to assist analysis and scope determination.

(2) Provide logistical support for all changes resulting from the RCM Workshop and ensure approved changes are incorporated into the PMS as quickly as possible.

(3) Process and forward TFBRs or other CMP change process documents resulting from the RCM analysis to the appropriate technical authority.

f. MPA System Engineers and Specialists:

(1) Provide technical expertise prior to and during the RCM Workshop in the area of off-ship maintenance requirements.

(2) Provide technical support to determine how approved recommended changes will be included in the CMP.

(3) Participate in the Community of Practice.

g. Hull Planning Yard Representatives:

(1) Provide technical input and assist the System Analyst.

(2) Participate in the Community of Practice.

h. INSURV SMEs:

(1) Provide technical expertise for Fleet maintenance discrepancies and best practices.

(2) Attend RCM Workshops as required and participate in the Community of Practice.

i. Fleet and TYCOMs:

(1) Provide shipboard experts for the systems scheduled for analysis.

(2) Attend RCM Workshops as required and participate in the Community of Practice.

j. Husbandry Agents:

(1) Provide technical expertise for fleet maintenance issues including Navy repair processes and best practices.

(2) Attend the RCM Workshop as required and participate in the Community of Practice.

4. RCM Workshop Procedures

a. RCM Workshop System Selection. Systems for RCM Workshops are selected through the use of the MP-EA process.

b. RCM Workshop Scheduling. Systems selected for analysis will be scheduled for review at RCM Workshops with consideration given to (but not limited to):

(1) Geographical location of fleet concentration areas. RCM Workshops should be held whenever possible in close proximity to ships with the system(s) being analyzed.

(2) Availability of meeting facilities

(3) Location and availability of fleet representatives for reviewed systems

(4) Availability of, and access to, required Information Technology systems.

c. RCM Workshop Timeline. The preparation and completion of a specific RCM Workshop will follow a project plan developed by the RCM Workshop Program Coordinator designed to allow sufficient time for planning, preparation, performance, and follow-up. A baseline project plan for an RCM Workshop will generally be aligned with the following notional timeline:

(1) Preparation: to begin about 3 months prior to date of the RCM event

(2) Event Performance: 1 week

(3) Follow-up:

(a) Post-event analysis and evaluation, 1 month.

(b) Generate and submit CMP maintenance requirement change recommendations by applicable change recommendation vehicle (TFBR or other change process document).

(c) Full implementation of results completed prior to ship system fielding, or for changes to existing system PMS within 6 months to correspond with the PMS Force Revision.

d. RCM Workshop Preparations. Preparations for the RCM Workshop consist of both a logistical and a technical component.

(1) Logistical Preparations

(a) Meeting Location Logistics. The RCM Workshop Program Coordinator will make arrangements for the necessary conference facilities and coordinate the logistics for each RCM Workshop.

(b) RCM Workshop Schedule Letter. The RCM Workshop Program Coordinator will provide dates and locations for each RCM Workshop included in the upcoming MP-EA cycle to the CMPWG Chairman for review, approval, and inclusion in the SEA 04RM schedule letter for FLEETMER, RCM Workshops, and Common Alignment MER events.

(c) RCM Workshop Announcement. The RCM Workshop facilitators will announce each RCM Workshop to all stakeholders. At a minimum, the announcement will contain: date and location; specific systems to be reviewed; request for TWH/TA, fleet, and Sailor participation; and points of contact.

(2) Technical Preparations

(a) System Preparation. The RCM Workshop facilitators will identify a CMP System Engineer or Specialist for each system scheduled for analysis. The RCM Workshop facilitators with the CMP System Engineer or Specialist(s) will identify key personnel that should be included in the Community of Practice and be notified of the RCM Workshop event.

(b) Community of Practice. The Community of Practice consists of shipboard and shore maintenance experts, and technical community. The Community of Practice should include the CMP Engineer or Specialist responsible for equipment requirements, NAVSEA technical personnel, applicable ISEA, Naval and/or commercial shipyard and RMC experts, maintenance team members, planning yard system engineers, applicable NSLC Commodity Specialists, and other relevant personnel. These personnel are identified early in the RCM Workshop planning process and are expected to participate in preparation for the RCM

Workshop event (when appropriate), and any post-event work such as procedure development or ship-checks of changed requirements or procedures. Community of Practice members should be selected from commands with the appropriate equipment and expertise. They should be identified by name and command and should correspond as required with the workshop team.

(c) Functional Block Diagram (FBD)

1. The RCM Workshop facilitators and the CMP System Engineer or Specialist will construct an FBD for the system. When needed, Community of Practice input will be solicited prior to the RCM Workshop event. The FBD is not designed to be a schematic but instead should be a high-level functional representation of the system scheduled for review. When possible, the block diagram should be created for all "common" systems (i.e., a single block diagram applies across all system or ship classes that have a similar function). Where a single common diagram is not possible, differences should either be noted on the single diagram or separate diagrams should be produced.

2. The creation of FBDs enables the Community of Practice and RCM Workshop participants to analyze and make decisions related to the structure of the maintenance program for the system(s) being reviewed. Some of the questions that can be addressed by the FBD include: Do the boundaries, defined by the FBD, contain all maintenance items expected to be reviewed during the RCM Workshop process? Are all the failure modes of concern for this system contained within the boundaries? Do all participants agree on the limits of the expected maintenance review? Are the various system types and implementation across classes similar enough that a common maintenance approach can be used on all types, simplifying the development, upkeep, and performance of the maintenance program? Where differences exist, what variations in the maintenance program need to be made to account for them?

3. The RCM Workshop participants will review the FBD and modify it as necessary at the onset of the RCM Workshop.

(d) Configuration/Logistic Data (as required). The RCM facilitators and CMP System Engineer or Specialist will associate configuration/logistic information to each RCM analysis planned for the scope of the RCM Workshop. This data is available from within the SUBMEPP Enterprise RCM application. The configuration/logistic data will be compared to the FBD to ensure all major configuration items are contained within the analysis boundary defined by the FBD. The configuration/logistic data together with the FBD are helpful in determining when common procedures can be implemented or when configuration differences require procedure variation.

(e) Technical Data. The RCM facilitators and CMP System Engineer or Specialist will identify and assemble any required technical data to include (but not limited to):

1. CMP and PMS maintenance requirements, tasks, and procedures

2. Relevant shipyard pre- and post-repair test procedures

3. INSURV, TYCOM, or other Naval activity checklists

4. Inspection criterion and procedures

5. Certification criterion and procedures

6. Assessment and troubleshooting guides

7. Incident or safety reports and recommendations

8. Operating procedures

9. Temporary operations or maintenance guidance

10. OEM manuals, Navy equipment technical manuals, and NSTMs

11. Industry best practices

12. Outstanding TFBRs or other CMP change process documents and CASREPs

13. CBM+ systems targeting studied or similar systems in use or development by the U.S. Navy or in commercial service.

(f) Operating Procedures. The RCM facilitators should compile and review Operating Procedures to ensure alignment with PMS and CMP requirements, mFOM, and configuration data. The review of operational procedures should specifically look for where maintenance requirements or procedures are duplicated by operational requirements or procedures. The Community of Practice should flag all areas where there are duplicative requirements and develop initial recommendations as to how duplicative requirements should be resolved.

(g) Maintenance History. The RCM facilitators and CMP System Engineer or Specialist should compile and review maintenance history information including 3-M and CASREP data for the system and components planned for RCM analysis in the RCM Workshop event. Additional efforts may involve coordinating a data call with NSWC Corona for the collection and analysis of data for Command, Control, Communications, Computers, and Intelligence (C4I) and combat systems, where similar systems with operational runtime are available for comparison. Raw data is reviewed for validity, to identify high-maintenance drivers, and to determine component failures and failure modes. The failure modes identified for each component are compared against those developed for the new system. Failure history for similar existing systems can also be used to identify relevant existing maintenance requirements for comparison to those developed during the RCM Workshop and the new system. This comparison may help to identify pertinent failures and the potential need for and suitability of CBM+ analysis.

(h) Commercial Best Practices. Where appropriate, the RCM Workshop facilitators will compile and review non-Navy (e.g., United States Coast Guard (USCG), American Bureau of Shipping (ABS), commercial, and other DoD) applications of the system to determine if any industry best practices should be discussed for potential adoption at the RCM Workshop.

(i) Maintenance Requirements Matrix. Whenever the RCM Workshop process is utilized for an existing Navy system, all existing maintenance requirements currently associated to equipment within the RCM analysis boundary will be imported into the RCM analysis and used for comparison to tasks generated from the Classic RCM process and methodology. The matrix sorts tasks based on similarity of action with a sub-sort by periodicity and ship class applicability. The matrix is a tool used to generate a broader understanding of the maintenance program associated with a particular system and is specifically used during the comparison activities of the RCM Workshop. Where appropriate, non-Navy maintenance tasks may also be shown in the matrix for comparison and evaluation purposes. The existing maintenance requirements can help the RCM Workshop facilitators and CMP System Engineer or Specialist planning for the RCM Workshop event by identifying:

1. Failure modes and effects that may be pertinent to the RCM analysis

2. Inconsistencies in maintenance plans for similar equipment across different ship classes or similar systems in the same class. The RCM analysis may indicate possible need for maintenance additions, subtractions, or realignments for certain ship classes or systems.

3. Duplication of effort among various PMS, CMP, assessment, or other tasks where better alignment of resources may be possible

4. Potential gaps in maintenance as evidenced by failure modes identified by INSURV results or other maintenance history for similar systems where the generation of new applicable and effective maintenance tasks can improve reliability and availability

5. Best practices that may exist in a particular system, ship class, or industry that can be adopted for similar systems to improve system reliability or availability, or to improve accomplishment methodology

6. Areas where CBM+ enabling technologies can be utilized if warranted.

(j) RCM Workshop Database

1. The most up-to-date information relating to all tasks currently associated with the system—including task descriptions, maintenance echelons, periodicity or frequency, and scheduling information—is collected and entered into the RCM Workshop Analysis database. SUBMEPP maintains this database and the application that uses it.

2. The Classic RCM database must provide the structure to capture detailed documentation of RCM Workshop analyses and justification for any modifications to tasks and procedures.

3. During or immediately following the RCM Workshop analysis event, the data collected within the Classic RCM database is used for actions outlined in the post-RCM Workshop topic (see paragraph 5). Following the completion of the RCM Workshop, the RCM analysis data is retained as a historical record.

(k) Review Materials. All materials required for review of the selected system for the RCM Workshop event (e.g., MIP, MRC, CMP Tasks, documentation forms, technical materials, etc.) will be assembled and delivered to the RCM Workshop location.

e. RCM Workshop Performance (Analysis Event)

(1) Analysis Overview. The RCM Workshop event is typically 1 week in duration and requires facilitation by at least one Classic RCM-certified practitioner experienced with new system maintenance requirements and facilitating RCM Workshops. Existing maintenance, where available, must be compared to the maintenance plan developed in the workshop.

(2) Classic RCM Analysis. The participants analyze the selected MIPs for the system using the MIL-STD-3034A (RCM Process)–compliant Classic RCM methodology and associated Classic RCM application. Certified facilitators assist the participants in the RCM Workshop analysis and record pertinent data within the Classic RCM application. Each facilitator has significant experience with Navy maintenance. Facilitators guide the participants through the Classic RCM methodology, maintain the process discipline, and are also available to answer questions about the RCM Workshop process and assist RCM Workshop participants in arriving at appropriate RCM-based decisions.

(3) Group Consensus. Group consensus by RCM Workshop participants is required for RCM analysis decisions and subsequent RCM-related recommendations and actions. Sufficient analysis should be performed and documented during the RCM Workshop event to ensure post-workshop actions such as developing the detailed maintenance procedures or TFBRs or other CMP change process documents can be accomplished without ambiguity.

(4) Approvals. All recommended maintenance changes for the event requires TWH/TA review and, as warranted, approval.

(5) Analysis Details. The following actions will be completed during an RCM Workshop under the RCM Workshop scope:

(a) Perform Classic RCM analyses on all selected system MIPs and MRCs.

(b) Validate RCM Partitioning. Review the system FBD with participants to ensure the group agrees on what is included within the system boundary and any distinct inputs and outputs from or to other systems.

(c) Perform System Functional Failure Analysis (FFA). Document system functions, functional failures, inputs, and references and provide a system description in the Classic RCM application. System redundancy is evaluated and documented for each component failure in the Failure Modes and Effects Analysis (FMEA).

(d) Establish RCM Analysis Boundaries. Identify configuration/logistic items imported from the maintenance planning database as Chosen Components, Support Components, or Piece Parts. Provide a written description of components within the RCM boundary and identify interfaces and document input and outputs at boundaries.

(e) Conduct FMEA. During the FMEA, the analysis team identifies component failures and associates them to system functional failures. The analysis team determines Failure Modes (Piece Part plus Failure Mechanisms) that potentially lead to component failure. The Local, System, and Ship effects are characterized and component failure criticality (function (severity, probability)) is established. The criticality level determines which component failures "Carry Through" for preventive maintenance evaluation. High-criticality component failures carry through and low-criticality component failures require failure mode identification, but no further analysis.

(f) Conduct Preventive Maintenance Tasks Evaluation (PMEVAL). RCM applicable and effective preventive maintenance tasks are developed to address all Critical Component Failure Modes. Following the RCM rules of applicability and effectiveness, these tasks attempt to eliminate or reduce the impact of each failure mode. Non-Critical Component Failures also require Failure Mode identification per MIL-STD-3034A, but do not require preventive maintenance tasks. Applicable and effective tasks are developed to address each failure mode. Each task that the analysis team develops is assigned a periodicity and rationale to support the rules of applicability and effectiveness.

(g) Roll Up to RCM Derived Maintenance Plan (Roll-Up). The RCM-based maintenance tasks resulting from PMEVAL are grouped with like maintenance items into discrete Maintenance Task Plans; this collection forms the RCM Derived Maintenance Plan. This step simplifies and synthesizes the task list to the best set of RCM applicable and effective tasks while maintaining the linkage to underlying FFA and FMEA logic and the analysis team rationale. The result of this step is the RCM Derived Maintenance Plan.

(h) Perform Maintenance Plan Comparison and Gap Analysis. This step is used to compare or contrast the existing Maintenance Plan against the RCM Derived Maintenance Plan. The analysis team adjudicates each discrepancy by adding, deleting, or modifying maintenance requirements. Legacy tasks without corresponding derived tasks may be recommended for deletion. The RCM rationale for all changes to the existing Maintenance Plan are quantified and documented. This step may also identify the need for CAP development. CAP development is

not typically accomplished during the RCM Workshop. The requirement for a CAP must be documented and submitted to the applicable activity for review.

(i) Clone Maintenance for Similar Systems. When similar system equipment on other ship classes is within the scope of the RCM Workshop event, the RCM analyses may be cloned to effectively apply a ship class Classic RCM analysis to other ship classes using similar equipment with differing configurations of the system analyzed. Cloning can also be considered for similar equipment in similar service on the same ship class. Cloning actions will effectively copy the RCM analysis information from FMEA to Roll-Up. Once cloned, the analysis team must review and validate the underlying assumptions and analysis described in paragraphs 4e(5)(b) through 4e(5)(g) before proceeding to the Maintenance Plan Comparison and Gap Analysis in paragraph 4e(5)(h). Cloning is an effective administrative time-saver, especially when many ship classes have similar equipment installed but have differing mission, ship, or local system requirements. Cloned analyses still require implementation of the unique maintenance plan comparison portion of the analysis.

(j) Review Operating Procedures. Operating procedures are reviewed to ensure they align with the maintenance requirements. A new maintenance procedure may be developed during the RCM Workshop and/or a TFBR or other change process document, depending on the maintenance echelon and task/action type, will be submitted to track completion of the development of the new requirement, task, or procedure. Recommended changes to the operating procedure(s) must follow the manual change request process.

(k) Consider CBM+ Applications. Consider the use of CBM+ enabling technologies where existing or proposed maintenance requirements will not satisfy safety, compliance, or operational goals. CBM+ enabling technologies may also be considered when there is a reasonable likelihood they will reduce total ownership cost.

(6) Analysis and Results Documentation. All analysis and results must be documented. Documentation includes RCM analysis results and decisions detailing failure modes, applicability, and effectiveness including justification for benefits (i.e., safety, environmental or regulatory, operational, or economic) and any proposed changes to procedure, schedule, level of performance, scope, etc. Attention should be taken in the analysis to capture and quantify cost avoidance and to quantify changes in Ao, describe changes to safety levels, and list specific abilities to comply with regulatory or statutory requirements.

(7) Change Reviews and Approvals. All recommended new maintenance or changes to existing maintenance as a result of the RCM Workshop will be submitted for approval by the RCM facilitators using the applicable feedback vehicle. Requirements that need additional action such as further research or development, or require review and concurrence from parties not at the RCM Workshop event (such as SEA 08 cognizant items) per reference (g), will be submitted per applicable feedback vehicle to document required actions and track accomplishment.

f. RCM Workshop Feedback. At the conclusion of the RCM Workshop event, feedback will be solicited from all participants. Feedback pertaining to the RCM Workshop process will be reviewed by SEA 04RM and evaluated for process improvement during the post-RCM Workshop Lessons Learned session described in paragraph 5e.

5. Post-RCM Workshop Activities

a. RCM Workshop Maintenance Changes. All new maintenance and modifications, including any additions or deletions, made to the respective systems during the RCM Workshop event will be documented and tracked for implementation.

b. RCM Workshop Metrics

(1) Completion Metrics for maintenance requirements (O-, I-, or D-Level) will address the following:

(a) Maintenance Requirements reviewed

(b) Maintenance Requirements validated and retained

(c) Maintenance Requirements periodicities changed

(d) Maintenance Requirements deleted

(e) Maintenance Requirements added

(f) Maintenance Requirements Condition-Directed Maintenance Periodicities refined

(g) Maintenance Requirements changed from Condition-Directed to Time-Directed

(h) Maintenance Requirements changed from Time-Directed to Condition-Directed

(i) Maintenance Requirements with modified scope

(j) Additional RCM identified items

(k) Projected cost impact.

(2) Cost avoidance must be quantified in cases where a maintenance change reduces failures based on existing failure data. When cost avoidance is not quantifiable, no cost impact is provided. A narrative should be provided to quantify changes in Ao, describe changes to safety levels, and list specific abilities to comply with regulatory or statutory requirements.

c. Results

(1) Workshop Results are issued formally via message, letter, or e-mail as appropriate within 60 days of the completion of the workshop, and will include: list of participants, completion and ROI metrics as noted in paragraph 5b (projected cost impact may require additional time to calculate), outstanding follow-on actions, and RCM Workshop Maintenance Change Summary report.

(2) A Technical Change Summary is provided to the TWH/TA, system technical stakeholders, and MPAs, which includes:

(a) A list of maintenance changes made and approved by the TWH/TA during the RCM Workshop

(b) A list of recommended maintenance changes that require further review and approval by the TWH/TA or require concurrent approvals from other organizations such as SEA 08.

d. Implementation of Changes

(1) Intermediate- and Depot-level maintenance echelon change recommendations resulting from the RCM Workshop will be forwarded by feedback vehicle to the applicable MPA for review and consideration to include in the CMP and inducted into the appropriate CMP change process by the respective MPA.

(2) For Organizational-level maintenance echelon change recommendations resulting from the RCM Workshop, a TFBR or other change process document will be entered and forwarded to the appropriate ISEA via the Commodity Specialist for tracking to completion.

(3) An e-mail documenting all recommended actions resulting from the RCM Workshop will be sent to RCM Workshop participants, and will include the action and assigned activity. This e-mail will supplement any CMP feedback vehicles. The e-mail will provide a comprehensive list of recommendations where an official feedback vehicle may not exist.

(4) If the recommended change is beyond the scope of authority of the technical warranted or delegated authority, such as those affecting Strategic Systems Programs, an applicable feedback vehicle will be generated to document the need for additional review and track accomplishment.

(5) CBM+ recommendations must be documented by Naval letter to the appropriate Program Office.

e. Lessons Learned

(1) A Lessons Learned meeting will be coordinated periodically to identify strengths and weaknesses of the process. This review is intended to guide and improve future RCM Workshops.

(2) Recommendations and feedback will be solicited from all RCM Workshop participants and stakeholders including (but not limited to): ISEAs, Fleet Representatives, NAVSEA/Technical Community, Facilitators, and NSLC Commodity Specialists.

(3) As necessary, incorporation of Lessons Learned will be issued as changes to this document.

COMMON ALIGNMENT
MAINTENANCE EFFECTIVENESS REVIEW (MER)

1. Overview

a. Common Alignment MERs are intended to address systemic maintenance problems that span the Navy enterprises. These MERs provide a flexible analysis framework for addressing difficult and persistent maintenance problems characterized by a lack of standardization in approach and/or a lack of basic understanding for the fundamental issues driving maintenance and maintenance requirements. The framework ensures that:

(1) Group insight is applied to the problems.

(2) Cross-Navy enterprise engineering and maintenance experiences are utilized.

(3) Underlying scientific and engineering justification and rationale for requirements are understood, challenged, exploited, and fully utilized.

(4) A wide range of Navy and non-Navy best practices and technologies are examined.

b. A Common Alignment MER is a multistage process. This process combines research on prevailing technologies and procedures with group sessions involving the TWH or TAs, senior maintainers, design engineers, and operator maintainers. The Common Alignment MER approaches issues strategically across enterprises, enables innovation and collaboration, and encourages higher-level broad-based thinking to identify, develop, and implement solutions. The following situations may indicate opportunities to identify Common Alignment MER candidates:

(1) Navy wide maintenance issues have not been satisfactorily resolved through other review processes.

(2) Unexplained maintenance or operational variance is observed across the Navy enterprises.

(3) Disagreements exist over the underlying engineering or scientific rationale supporting maintenance or operational approaches.

(4) Recognized technology advances may provide opportunities to improve Navy maintenance such as CBM+ and advanced material application technologies.

c. A Community of Practice is established to support a Common Alignment MER. The Community of Practice holds facilitated meetings on a periodic basis and conducts a flexible and thorough examination of the issue. Specifically, the Community of Practice identifies and defines problems, specific goals, end states, best practices, and potential solutions and delivers a Plan of Action and Milestones (POA&M) to achieve the stated goals.

2. Common Alignment MER Process. The Common Alignment MER is a series of events where insights gained from one stage may cause recursive evaluation of results from other stages. Due to the in-depth analysis performed during a Common Alignment MER, it typically takes far longer than other Maintenance Effectiveness Reviews.

a. Defining the Common Alignment MER Scope

(1) CMPWG defines the problem space and quantifies the potential costs and benefits. Known Navy wide maintenance issues are listed and variation analysis is conducted to uncover underlying problem areas. Variations in requirements, planning, or execution are identified, quantified, and correlated to the circumstances.

(2) Current maintenance requirements and programs are analyzed to compare preventive to corrective maintenance costs, both before and after any changes to policies, processes, or maintenance requirements associated with the study. The underlying engineering, scientific, and technological rationales supporting maintenance approaches are identified and documented.

(3) In the course of the study, the list of problems typically grows. Problems are prioritized based on their size, scope, and impact; metrics are established to baseline the problems; and goals are set to drive improvement. The CMPWG reviews the results of this stage and determines the scope of the resultant investigation.

b. Getting Back to Basics

(1) The Common Alignment MER team performs a back-to-basics review considering major engineering, scientific, and technological disciplines that should be brought to bear on the topic area. For each discipline, a literature search is conducted to identify the relevant basic theories and recent engineering, scientific, and technological progress. From this review, the team develops a list of foundation principles and relevant theories most applicable to the topic area.

(2) The purpose of the review is to gain broad insight into the issues of current concern outside the Navy and approaches used by non-Navy activities for similar challenges. Ship visits and interviews up and down the ship chain-of-command are conducted to gain firsthand experience and an unvarnished viewpoint of problems. The CMPWG proceeds to map the in-service problems to the appropriate engineering and scientific disciplines required to conduct a deeper look into the root causes.

(3) Root Cause analysis starts by reviewing available Navy maintenance repair history and test results. In some cases, because Navy maintenance and test data is not available, it becomes necessary to gather data from ongoing maintenance and testing operations. Beyond the documentation review, interviews of repair personnel at all relevant echelons of the Navy repair infrastructure (Organizational, Intermediate, and Depot) are conducted to collect their experiences maintaining and repairing the equipment. CMPWG representatives typically visit

shops conducting ongoing maintenance to observe actual failure modes on equipment and to review discovery and repair techniques. Statistical analysis of repair and testing data is accomplished and correlated to real-world observations from the ships and shops using current Navy repair practices. Navy data is compared to other data, if available, from government agencies and relevant commercial industries.

c. Exploring Best Practices

(1) The Common Alignment MER team documents current Navy maintenance and repair practices. Maintenance Plan requirements for all repair levels and all ship classes are collected into a matrix and are compared for variance across ship types and classes. Maintenance and repair costs are also gathered and compared at the system and component levels across ship types and classes. Equipment Ao graphs are created and compared, looking for correlations between maintenance requirements or practice changes and changes in resultant cost or availability.

(2) The MPAs are queried for relevant maintenance best practices they may have developed or implemented, and these best practices are validated against other data gathered. Government agencies or commercial industries are also queried and compared for relevant maintenance best practices they have implemented. Best practices are compared to each other and the Navy baseline to quantify expected gains if implemented. Best practices are examined critically in order to determine why they work, as this knowledge can lead to further insights and improvements.

d. Investigating New Technologies

(1) The CMPWG conducts a thorough search for new technologies and approaches. Basic research journals are reviewed for recent engineering, scientific, and technological advances that could serve as the basis for new approaches. Related or similar equipment sharing the same basic theories and engineering principles are investigated to identify beneficial new technologies that might be extendable to the Common Alignment MER topic area. The group reviews current DON and other government agency technology initiatives, including CBM+ enabling technologies, to see if any are applicable and effective. Industry literature is reviewed to identify commercially available technologies.

(2) New technologies and approaches are compared to Navy issues quantified when the Common Alignment MER team defined the scope and the list of potential best practices. Those that might solve or improve Navy issues and practices are identified and evaluated in terms of technical readiness level and cost required to investigate and implement.

e. Building Solution Sets

(1) The Community of Practice reviews all data and research in a facilitated 2- or 3-day session. The first part of the meeting is dedicated to discussing data. The second part is to actively challenge all current maintenance practices and requirements in order to identify all possible areas for improvement or cost savings. The Community of Practice engages in a

brainstorming session to discuss and evaluate best practices. New technologies and approaches are introduced and discussed to identify their relevance to the problems previously defined and quantified. The Community of Practice prioritizes the lists of best practices, new technologies, and new approaches based on potential cost benefits, costs to implement, readiness, and difficulty to implement. Actions are assigned to the Community of Practice members to follow up and investigate issues that could not be addressed during the session. The ultimate output is a prioritized solution set that merits further investigation.

(2) The direction of the Common Alignment MER is driven by the nature of the solution set and action items assigned to the group by its members. The CMPWG hosts additional meetings as needed to follow up on action items, gather additional information, continue discussions, and develop detailed recommendations and plans. The timeline for each Common Alignment MER is highly dependent on the amount of research and investigation required.

f. Implementing Improvements

(1) In many cases the membership of the Common Alignment MER Community of Practice includes the activity with the authority to approve and implement the recommendations, especially those associated with changes to maintenance requirements and procedures. In these cases, the responsible activity takes the necessary actions to establish the group's recommendation as a requirement. In other cases, recommendations require higher-level approvals or additional resources.

(2) When higher-level approvals are required, the CMPWG seeks approval for wider implementation of changes, concurrence with recommendations and plans, and resourcing decisions for unimplemented recommendations. Common Alignment MER results are published in a detailed report fully explaining the processes and data used as well as laying out all unimplemented recommendations and POA&Ms. The results are briefed to the CMPWG Executive Committee consisting of NAVSEA, PEO, and Fleet executives.

(3) When other resources are required, the working group develops detailed recommendations, calculates projected ROI, recommends POA&Ms, writes point papers, and delivers required presentations. At the end of the Common Alignment MER process, a briefing is conducted for a wider group of stakeholders including NAVSEA, Fleet, and TYCOM decision makers. The briefing covers the full process including all data, implemented changes, additional resources requested, and associated POA&Ms.

(4) After the Common Alignment MER completion, the working group continues to engage with implementing organizations to assist as required, and keeps the EXCOM apprised of progress.

3. <u>Roles and Responsibilities</u>

a. CMPWG Chairman:

(1) Coordinates and executes Common Alignment MERs and ensures resources are efficiently utilized.

(2) Ensures the proper experts and organizations for systems under review are identified and invited to Common Alignment MERs. Experts and organizations are not limited to SYSCOMs and SYSCOM field personnel or activities, but can include other organizations (such as Original Equipment Manufacturers, the Navy Safety Center, or inspecting and certifying organizations).

(3) Ensures the approved TWH/TA participates in Common Alignment MERs and approves all appropriate and agreed-upon maintenance requirements changes.

(4) Manages Common Alignment MER results and changes to ensure all changes are properly implemented.

(5) Ensures all changes affecting Nuclear Propulsion Plant Systems are forwarded to SEA 08 for concurrence, as stated in reference (g) (3-M Manual).

(6) Ensures all changes affecting Strategic Systems Programs are forwarded to DIRSSP for concurrence.

(7) Assigns appropriate personnel to the key role of Common Alignment MER Project Coordinator.

(8) Ensures Regional Maintenance Centers and Shipyards provide expertise for fleet maintenance issues including failure mode identification and validation, and Navy repair processes and best practices.

(9) Ensures Regional Maintenance Centers and Shipyards participate in the Community of Practice and attend the Common Alignment MER as required.

b. Common Alignment MER Project Coordinator:

(1) Schedules and coordinates the Common Alignment MER process and supervises system analysts.

(2) Serves as the POC between the maintenance community and internal stakeholders.

c. TWHs or TAs:

(1) Approves and disapproves changes to system maintenance requirements.

(2) Attends Common Alignment MER meetings and participates in the Community of Practice as required.

(3) Evaluates and implements appropriate Common Alignment MER recommended changes in a timely manner.

d. NSLC Commodity Specialists:

(1) Provide 3-M system technical expertise over the course of the Common Alignment MER to assist analysis and scope determination.

(2) Provide logistical support for all changes resulting from the Common Alignment MER and ensure approved changes are incorporated into the PMS system as quickly as possible.

(3) Process and forward TFBRs or other CMP change process documents resulting from the Common Alignment MER recommendations to the appropriate technical authority.

(4) Attend Common Alignment MER meetings and participate in the Community of Practice as required.

e. MPA Engineers or System Specialists:

(1) Provide technical expertise over the course of the Common Alignment MER in the area of off-ship maintenance requirements.

(2) Provide expeditious logistical support for all changes resulting from the Common Alignment MER into the CMP.

(3) Attend Common Alignment MER meetings and participate in the Community of Practice as required.

f. Hull Planning Yard Representatives:

(1) Provide technical input as required.

(2) Attend Common Alignment MER meetings and participate in the Community of Practice as required.

g. INSURV SMEs:

(1) Provide technical expertise for fleet maintenance discrepancies and best practices.

(2) Attend Common Alignment MER meetings and participate in the Community of Practice as required.

h. Fleet and TYCOMs:

(1) Provide shipboard experts for the system scheduled for review.

(2) Attend Common Alignment MER meetings and participate in the Community of Practice as required.

i. Husbandry Agents:

(1) Provide technical expertise for fleet maintenance issues including Navy repair processes and best practices.

(2) Attend Common Alignment MER meetings and participate in the Community of Practice as required.

4. Schedule. Common Alignment MER timelines are developed by the CMPWG Chairman to support Navy priorities. The execution schedule for each Common Alignment MER will be flexible and based on the individual circumstances of each event.

5. Post-Common Alignment MER. To the maximum extent possible, all Common Alignment MER changes and recommendations must be quantified in terms of the estimated cost and funding to implement compared to the expected cost reductions or equipment operational availability improvement and time required to realize benefits. Common Alignment MER results must be documented in a technical report that provides an overview of initial problems that triggered the Common Alignment MER, summarizes the Common Alignment MER team efforts, describes all potential options considered, justifies recommendations, quantifies expected costs and benefits, and outlines actions still required.

COMMON MAINTENANCE PLANNING WORKING GROUP (CMPWG) ORGANIZATION

The CMPWG (EXCOM) is chaired by SEA 04 with 04R assistance, and includes a senior representative from each of the organizations shown in Figure 1 below.

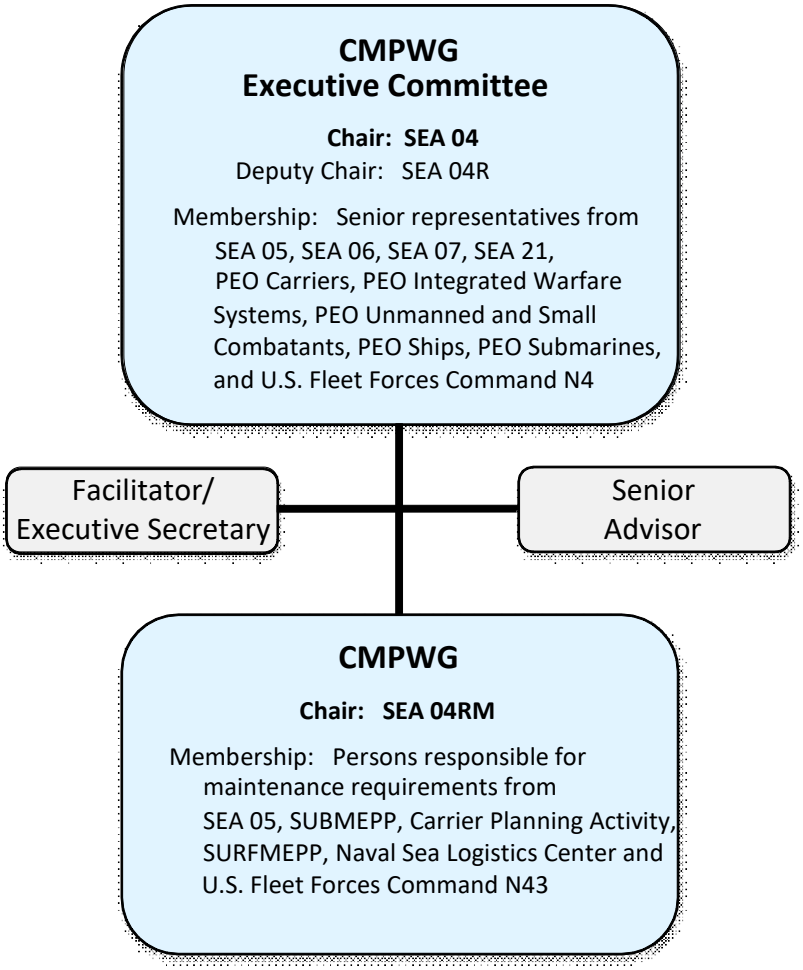

Figure 1. CMPWG Organization

The CMPWG is chaired by a designated individual from SEA 04RM. Membership in the working group consists of appropriate representatives from the organizations listed in Figure 1 above that are responsible for development of carrier, submarine, and surface ship Class Maintenance Plan requirements. The working group is accountable to the CMPWG EXCOM. Both the EXCOM and the working group are assisted by a Facilitator/Executive Secretary and a Senior Advisor.

GLOSSARY OF TERMS AND ACRONYMS

3-M Manual	Ships' Maintenance and Material Management (3-M) Manual
ABS	American Bureau of Shipping
ACAT	Acquisition Category
Ao	Operational Availability
C4I	Command, Control, Communications, Computers, and Intelligence
CAP	Common Assessment Procedure
CASREP	Casualty Report
CBM (Condition Based Maintenance)	A Maintenance philosophy by which maintenance is performed based on the material condition of components, equipment, subsystems, and systems.
CBM+	Condition-Based Maintenance Plus. CBM+ is a term used to describe the application and integration of appropriate processes, technologies, and knowledge-based capabilities to better understand equipment health, and to trigger applicable and effective maintenance actions.
CFBD	Common Functional Block Diagram
CMP	Class Maintenance Plan – all tasks required to maintain components, equipment, subsystems, and systems throughout their useful service life.
CMPWG	Common Maintenance Planning Working Group
Common Alignment MER	Common Alignment Maintenance Effectiveness Review
Community of Practice	The Community of Practice consists of shipboard and shore maintenance experts, and the NAVSEA Technical Community who provide technical assistance in MER preparation, MER analysis, and post-MER evaluation of changes.
CNO (N00N)	Naval Nuclear Propulsion Program, also known as Naval Sea Systems Command (SEA 08)
CPA	Carrier Planning Activity (PMS 312C). CPA is the Maintenance Planning Activity for aircraft carriers by direction of PEO Carriers (PMS 312).
DIRSSP	Director, Strategic Systems Programs
DoD (or DOD)	Department of Defense (DoD preferred)
DoDD	Department of Defense Directive. DoDDs are reserved for subjects requiring direct oversight by the Secretary or Deputy Secretary of Defense. DoDD is a DoD issuance that exclusively establishes policy, assigns responsibility, and delegates authority to the DoD Components.

DoDI	Department of Defense Instruction, of which there are two types: 1) A "policy" DoDI establishes policy and assigns responsibilities within a functional area assigned in an OSD Component head's chartering DoDD, including defining the authorities and responsibilities of a subordinate official or element when these do not meet the criteria for a chartering DoDD. Policy DoDIs may also provide general procedures for implementing that policy. 2) A "non-policy" DoDI implements policy established in a DoDD or a policy DoDI by providing general and overarching procedures for carrying out that policy.
DON (or DoN)	Department of the Navy (DON preferred)
EIC	Equipment Identification Code
Enterprise	Refers to the big Navy enterprise or the three Navy ship enterprises—Submarine, Carrier, and Surface—depending on use and context.
ESWBS	Expanded Ship Work Breakdown Structure
ETAM	Engineering and Technical Authority Manual
EXCOM	Executive Committee
FBD	Functional Block Diagram
FFA	Functional Failure Analysis
FLEETMER	Fleet Maintenance Effectiveness Review
FMEA	Failure Modes and Effects Analysis
HAZMAT	Hazardous Material
HM&E	Hull, Mechanical, and Electrical
Husbandry Agent	This term includes Maintenance Planning Managers (MPM) for carriers and Port Engineers for surface ships.
INSURV	Board of Inspection and Survey
ISEA	In-Service Engineering Agent. Works on behalf of a Technical Warrant Holder (TWH) for an assigned system per formal written designation.
MAINTENANCE	Actions taken to ensure components, equipment, subsystems, and systems provide their intended functions when required.
MCC	Mission Criticality Code
MCSC	Marine Corps Systems Command
MER	Maintenance Effectiveness Review
mFOM	Maintenance Figure of Merit. mFOM provides near real-time material-based readiness reporting to the Defense Readiness Reporting System-Navy.
MIL-STD	Military Standard
MIP	Maintenance Index Page

MPA	Maintenance Planning Activity, of which there are three: 1) Submarine Maintenance Engineering, Planning, and Procurement (SUBMEPP) 2) Carrier Planning Activity (CPA) 3) Surface Maintenance Engineering Planning Program (SURFMEPP).
MP-EA	Maintenance Planning–Engineering Analysis
MPM	Maintenance Planning Manager, title of an assigned individual who performs husbandry agent duties for aircraft carriers. The closest equivalent for surface ships is the Port Engineer.
MRC	Maintenance Requirement Card
NAVAIR	Naval Air Systems Command
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
NAVSEAINST	NAVSEA Instruction
NAVSEASYSCOM	Naval Sea Systems Command
NAVSUP	Naval Supply Systems Command
NAWC	Naval Air Warfare Center
NSLC	Naval Sea Logistics Center
NSTM	Naval Ships' Technical Manual
NSWC	Naval Surface Warfare Center
NUWC	Naval Undersea Warfare Center
O, I, and D	Organizational (Shipboard), Intermediate, and Depot — the three levels of maintenance
OARS	Open Architecture Retrieval System
OEM	Original Equipment Manufacturer
OPNAVINST	Naval Operations (OPNAV) Instruction
PEO	Program Executive Office
PMEVAL	Preventive Maintenance Tasks Evaluation
PMS	Planned Maintenance System
PMSMIS	Planned Maintenance System Management Information System. The PMSMIS is NAVSEA's system used to define and promulgate Organizational-level maintenance requirements. SEA 04RM and NSLC are the two primary organizations responsible for maintaining the policy, process, and tools of the PMSMIS.

POA&M	Plan of Action and Milestones
POC	Point of Contact
Port Engineer	Title of an assigned individual who performs husbandry agent duties for surface ships
QA	Quality Assurance
RCM	Reliability-Centered Maintenance
RCM Events	Refers to CMPWG-approved Maintenance Effectiveness Reviews (for example, RCM Workshops, FLEETMERs, and Common Alignment MERs)
RMC	Regional Maintenance Center
ROI	Return on Investment
SDM	Ship Design Manager
SEA 04	NAVSEA, Logistics, Maintenance, and Industrial Operations Directorate
SEA 04RM	NAVSEA, Director of Maintenance Engineering
SEA 05	NAVSEA, Naval Systems Engineering Directorate
SEA 06	NAVSEA, Acquisition and Commonality Directorate
SEA 07	NAVSEA, Undersea Warfare Directorate
SEA 08	NAVSEA, Naval Nuclear Propulsion Program, also known as CNO (N00N)
SME	Subject-Matter Expert. Includes but is not limited to INSURV Inspectors, System Field Experts, and RMC Maintenance and Repair personnel.
SPAWAR	Space and Naval Warfare Systems Command
Stakeholders	Those who have a share or interest in Navy ship maintenance. Stakeholders as used in this document may include but are not limited to: 1) Navy maintenance community Engineers (e.g., TWHs/TAs, ISEAs, SDMs, MPMs, and Port Engineers; and SUBMEPP, CPA, and SURFMEPP Engineers/System Experts) 2) System SMEs (e.g., INSURV Inspectors, System Field Experts, RMC Maintenance and Repair personnel) 3) Fleet Maintainers (e.g., TYCOM and Ship Repair personnel, OEM System Specialists) 4) PMSMIS Experts
SUBMEPP	Submarine Maintenance Engineering, Planning, and Procurement. SUBMEPP is the Maintenance Planning Activity for submarines by direction of PEO Submarines.
SURFMEPP	Surface Maintenance Engineering Planning Program. SURFMEPP is the Maintenance Planning Activity for surface ships by direction of PEO Ships (SEA 21).

SYSCOMs	Systems Commands. The current Navy Systems Commands are NAVSEA, NAVAIR, SPAWAR, NAVFAC, NAVSUP, and MCSC.
TA	Trusted Agent. Refers to a formally designated individual who acts on behalf of a technical authority. An In-Service Engineering Agent is an example of a TA.
TFBR	Technical Feedback Report (usually PMS TFBR)
TPMTE	Tools, Parts, Materials, and Test Equipment. Refers to the section of an MRC that lists the required items to properly perform the maintenance procedure.
TSLR	Time Since Last Reviewed
TWH	Technical Warrant Holder. Refers to an individual to whom a NAVSEA warranting officer has assigned authority, responsibility, and accountability to establish, monitor, and approve technical products and policy. TWH is the authoritative expert for a warranted technical area for the field and fleet. TWHs may have TAs that work on their behalf for shipboard engineering and maintenance.
TWH/TA	Technical Warrant Holder or Trusted Agent
TYCOM	Type Commander
USCG	United States Coast Guard
USN	United States Navy