DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
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IN REPLY TO
NAVSEAINST 5400.108A
Ser 00/120
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NAVSEA INSTRUCTION 5400.108A

From: Commander, Naval Sea Systems Command

Subj: POLICY FOR QUALITY MANAGEMENT OF WORK ON NON-NUCLEAR SURFACE SHIP CRITICAL SYSTEMS

Ref: (a) COMUSFLTFORCOMNOTE 9080 of 10 May 11, U.S. Fleet Forces Surface Ship Availability Work Certification and Completion Requirements
(b) COMNAVSURFPACINST/COMNAVSURFLANTINST 3504.1, Redlines Implementing Instruction
(c) COMFLTFORCOMINST 4790.3, Joint Fleet Maintenance Manual
(d) Approved NAVSEA Standard Items (NSI)
(e) NAVSEAINST 5400.95E, Waterfront Engineering and Technical Authority Policy

Encl: (1) List of Surface Ship Critical Systems by class

1. Purpose. To establish policy for quality management of work on non-nuclear surface ship critical systems. This instruction applies to all intermediate (I) and depot (D) level work, including SCN post-delivery items, for systems listed in enclosure (1). Work, per Volume II of reference (c), for this instruction, is defined as: Any action that actually or potentially changes (including disassembly for the purposes of inspection or repair) the approved configuration of any part, component or ship's system, as well as, any action that removes or affects the ship's ability to operate ship's systems or components per ship's systems/operating manuals.

CNRMC shall issue an implementation plan for this policy by 1 September 2011 and implement the plan by 1 October 2011. The existing version of this policy (NAVSEAINST 5400.108 of 6 June 2011) shall be in effect and executed until then, after which it will be superseded in its entirety by this instruction.

This policy:

a. Specifies critical systems for non-nuclear surface ships. Enclosure (1) identifies these systems;

b. Requires Controlled Work Package (CWPs) or Expanded Process Control Procedures (EPCP) be used for work on critical systems;

c. Requires, prior to conduct of work on a surface ship critical system, validation by Naval Supervising Authority of wholeness of the Quality Management Programs of the organizations (e.g., NSA, Lead Maintenance Activity (LMA), and Repair Activity (RA)) responsible and accountable for performing quality maintenance;

d. Requires conduct of Readiness to Start (RTS) reviews, jointly conducted by the NSA with the Engineering Field Representative (EFR), LMA, RA, Commander Navy Regional Maintenance Center (CNRMC) (notification is required, participation is optional) and Forces Afloat (notification is required, participation is optional), prior to work starting on a surface ship critical system;

e. Requires NSA review maintenance plans and results with NAVSEA 05 and either PEO or CNRMC (as appropriate) prior to starting work and upon completion of work (to include separate notification upon completion of pier-side and upon completion of at-sea testing) on Main Propulsion Systems on all classes of ships, as identified in enclosure (1). This review is recommended to be conducted at a time that minimizes probability of inappropriately impacting start of work, e.g, prior to work definitization;

f. Requires the new construction NSA coordinate implementation of the requirements in this policy with the associated acquisition Program Office for SCN post-delivery funded work on systems in enclosure (1). Coordination does not mean negotiation - NSA shall oversee the repair work per this instruction;

g. Shall be reviewed on 1 June 2012 to assess cost and effectiveness for the purpose of making appropriate changes, as necessary;

h. Does not apply to Naval Shipyards performing Depot Level Work in accordance with Task Group Instructions approved by the shipyard's Chief Engineer. Also, does not apply to Ship Repair Facility (SRF) Yokosuka, Japan, SRF Detachment in Sasebo, Japan, and Trident Refit Facilities (TRF). Norfolk Naval Shipyard (NNSY) will be acting for NAVSEA as "higher authority" for Main Propulsion Diesel Engine work. Vendor generated EPCP's, once approved by NSA Code 200, shall go to NNSY for review/approval as required, vice NAVSEA 05;

i. Shall be effective upon implementation of CNRMC's plan for complying with the requirements of this policy. Commander's intent is for the implementation plan to be in execution on or before 1 October 2011.

Note: CWP is used generically throughout the document to represent CWPs for intermediate level and public depot level, and EPCP for private depot level maintenance.

2. Background. Recurring and persistent failures in critical systems on various classes of ships have resulted in excessive costs for repairs, decreased operational capability, and availability. This problem was caused by inadequate production work processes, inadequate repair activity Quality Management programs, and inadequate government oversight. To eliminate the causes of this problem and prevent recurrence, additional controls for work on critical systems on surface ships are required. These controls, as specified by this policy, support and are consistent with the requirements of reference (a).

3. Policy.

a. Critical Systems. Reference (b) lists systems the surface ship Type Commanders have designated as required for a ship to get or to remain underway. The critical systems identified in this instruction are a subset of the systems listed in reference (b), with consideration given to risk to complete corrective maintenance without incurring unacceptable impact to operational schedules. The list of critical systems is provided in enclosure (1) and are designated by NAVSEA 05 and concurred on by the Surface Ship Type Commanders. These systems require additional oversight and controls of work and testing accomplished during repair/maintenance. (Note: where the term work is used in this instruction, it is meant to include testing)

b. Use of Controlled Work Packages (CWP)/Expanded Process Control Procedures (EPCP). All Intermediate and Depot level work and modernization (to include work accomplished by Alteration Installation Teams (AITs), Ship's Engineering Maintenance Assistance Teams (SEMAT), craftsmen working for In-Service Engineering Agents (ISEA) and Warfare Center craftsmen) on surface ship critical systems shall be performed using a CWP/EPCP; the CWP/EPCP content shall be consistent with the CWP requirements of reference (c). (Note: The definition of work is found in reference (c) Volume V). CWPs/EPCPs on critical systems are composed of three parts which can broadly be described as: work procedure preparation; work procedure implementation; and, work procedure certification. A Process Control Procedure (PCP) (NAVSEA Standard Item 009-09) can be an effective starting point for the development of a CWP/EPCP.

(1) CWP/EPCP preparation. The NSA is accountable to the PEO or CNRMC for ensuring CWPs/EPCPs are consistent with the requirements of reference (c) and are correct prior to work

starting, to include adequacy of inspection, verification, and government check points and of required OQE. To meet this requirement, the NSA CHENG, per delegated technical authority, must verify that all Standard Items, Local Standard Items, Specifications, and Process Control Procedures employed in conduct of the maintenance on critical systems are technically correct. Any required coordination with NAVSEA 05 and TWH's should occur at a time appropriate to not delay work execution, e.g., prior work definitization.

(2) CWP/ECP implementation. CWP/EPCP execution shall be consistent with the requirements of reference (c).

(3) CWP/EPCP certification (post work completion). The NSA shall formally certify each CWP/EPCP by closeout review.

The NSA/LMA shall develop and issue a Standard Operating Procedure (SOP) for its CWP/EPCP process and submit to CNRMC and NAVSEA 05 for information.

Note 1: Reference (c) requires CWPs/EPCPs be used for more than these critical systems; this policy does not change that requirement nor does this policy change requirements for PCP's and Specifications for work on systems other than surface ship critical systems listed in enclosure (1). For example, reference (c) requires CWPs/EPCPs be used for multiple work items on surface ships, including welding/brazing that results in permanent repairs and alterations of the primary structure, for Recovery Assist, Securing, and Traversing systems, and for Level 1 portions of steam systems - this policy does not affect those requirements.

Note 2: The CWP/EPCP must specify all phases of required testing, including pre-operational testing, in-port testing, and at sea testing. Prior to transitioning from one phase of testing to the next, the testing must be certified or a waiver/deviation approved by technical authority. An availability is not complete until all at-sea testing required by the CWP/EPCP is complete and results certified by NSA.

(4) NAVSEA Standard Item 009-77 delineates requirements for maintaining watertight integrity to a level 4 feet above the maximum anticipated draft through the use of cofferdams (plugs, patches, dry chambers, and stern tube seals). Requirements include (1) the use of NAVSEA Standard Item 009-09, "Process Control Procedure; provide and accomplish", for the management and control of cofferdams and (2) an "Authorization for Single

Valve Isolation" checklist (Attachment A to Standard Item 009-77). Where work on sea-connected systems requires use of cofferdams per NAVSEA Standard Item 009-77 the Process Control Procedure (PCP) generated in support of the work shall conform to the requirements of this policy. This applies to work performed by either a contractor or government work force. Where less than double-valve protection/isolation from sea is provided to a level 4 feet above the maximum anticipated draft and a cofferdam is not reasonably feasible, work performed on sea-connected systems shall be performed using PCP's that conform to the requirements of this policy.

c. Validation of Wholeness of Quality Management Programs. The requirements for and descriptions of Quality Management Plans are contained in references (c) and (d), and/or as specified in the terms and conditions of the contract(s) established for conduct of the work - all RA's and activities conducting modernization shall have a QMP. The NSA is accountable for ensuring the QMP's of all organizations responsible and accountable for conducting the proposed maintenance on critical systems are in place and are adequate for work being performed, and for maintaining a sound Contract Administration of the Quality Assurance Program (CAQAP); reference (c) provides NSA CAQAP requirements.

This policy requires, prior to work starting on a surface ship critical system, the NSA validate the wholeness of the RA (or activity conducting modernization) and NSA QMP's by completing, as a minimum, a review of: adherence of the RA to the RA's relevant audit and surveillance plans; all open actions from Method A, B, C, and D Corrective Action Requests (CAR); critiques involving RA's work; CAQAP audits and audits of the NSA; qualification status of the RA's assigned mechanics (when required), supervisors, and inspectors- to include the government inspectors conducting "G" point checks- and verification that the qualification status meets the requirements of the work to be performed; and, lessons learned from prior work performed by the RA on the critical system(s).

The NSA shall develop and issue an SOP for its QMP validation process and submit to CNRMC and NAVSEA 05 for information.

Note: This policy does not change NSA and RA responsibilities for meeting NAVSEA, Fleet, TYCOM, and contractual requirements for Quality Management for non-critical systems. Prior to the start of any maintenance on any surface ship system, the NSA is the responsible Navy agent for ensuring that required QMP's and the NSA CAQAP are sound.

d. Readiness to Start (RTS) Reviews (Note: This requirement is not related to Readiness to Start message requirements). The purpose of a Readiness to Start review is to verify through a joint meeting that includes the NSA/LMA, Engineering Field Representative (EFR), RA, CNRMC (optional), and Forces Afloat (optional); usually a ship's force representative), that all participants in the work on a surface ship critical system are fully prepared to execute and certify the work.

The NSA shall develop and issue a Standard Operating Procedure (SOP) for RTS conduct and submit to CNRMC and NAVSEA 05 for information.

The NSA shall invite the NAVSEA EFR to all RTS's, shall issue minutes for all RTS's and include NAVSEA on distribution.

d. NAVSEA 05 Notification Prior to Starting Work on Critical Systems. For specific critical systems starred in enclosure (1), NAVSEA 05 Headquarters, specifically the applicable Technical Warrant Holder, Ship Design Manager and NAVSEA Chief Engineer, shall be personally notified prior to starting work and upon completion of work (to include notification upon completion of pier-side testing and upon completion of at-sea testing). This engagement should be timed to avoid delay to execution of work, e.g., prior to work definitization.

4. Responsibility:

a. NAVSEA 05.

(1) Designate and maintain critical systems lists per the requirements of this instruction for all classes of surface ships.

(2) When contacted by the NSA and prior to starting work, review with NSA the maintenance plans (including all phases of testing) for critical systems. This contact is required for MPDE and MRG systems. This review is not required to be on-site/face-to-face. This review should be timed to not delay conduct of work.

(3) Retain current copies of and be familiar with NSA's SOP's for CWP/EPCP, QMP Validation, and RTS.

b. CNRMC

(1) Execute the requirements of this instruction and assign responsibilities as required. CNRMC shall develop an implementation plan by 1 September 2011, and submit to NAVSEA 00 for approval.

(2) As part of implementation plan, CNRMC shall require NSA's to conduct a risk assessment of work items currently in execution or planning, and provide to CNRMC the job-specific risk mitigation actions for those items. The requirement to provide to CNRMC the job-specific risk mitigation actions will cease upon implementation of CNRMC's plan for complying with the requirements of this policy. Commander's intent is for the implementation plan to be in execution on or before 1 October 2011.

(3) Ensure NSA SOP's for CWP/EPCP, QMP Validation, and RTS are maintained in an up-to-date status. Extent of standardization of SOP's across RMC's is to be determined by CNRMC.

(4) Enable EFR participation in RTS's for critical systems on surface ships.

(5) Identify experienced work specification development personnel and form a core group that will hold formal reviews of work specifications for Critical Systems, and align this group's activities with those of the Standard Specification for Ship Repair and Alteration Committee (SSRAC).

(6) Develop a training and qualifications program to educate NSA/LMA on work specification development as well as the application of NAVSEA Standard Items.

(7) Coordinate SURFMEPP involvement in this process to include capture of "best practice" SOPs and lessons learned for future reference and optimum standardization of critical systems maintenance.

c. PEO/NAVSEA 04

(1) Execute the requirements of this instruction and assign responsibilities as required.

(2) Ensure NSA SOP's for CWP/EPCP, QMP Validation, and RTS are maintained in an up-to-date status. Extent of standardization of SOP's across SUPSHIP's is to be determined by NAVSEA 04.

(3) Enable EFR participation in RTS's for critical systems on surface ships.

(4) Identify experienced work specification development personnel and form a core group that will hold formal reviews of work specifications for Critical Systems.

(5) Develop a training and qualifications program to educate NSA on work specification development as well as the application of NAVSEA Standard Items.

d. NSA

(1) This instruction does not apply prior to delivery. The new construction NSA shall coordinate implementation (SCN post-delivery funded) of the requirements in this policy with the associated acquisition Program Office. Coordination does not mean negotiation - the NSA shall oversee the repair work IAW this instruction, and Program Office provide the required funding.

(2) For work items in execution, provide job-specific risk mitigation steps based on risk assessment to CNRMC as part of CNRMC implementation plan. This requirement will cease upon implementation of CNRMC's plan for complying with the requirements of this policy. Commander's intent is for the implementation plan to be in execution on or before 01 October 2011.

(3) Use Standard Operating Procedure's (SOP's) for utilization of CWP's, QMP validation, and conduct of RTS's on critical systems for surface ships and submit to NAVSEA (CNRMC/PEO and SEA 05) for information.

(4) Ensure CWP's specify all phases of testing from pre-operational testing to at-sea testing and locate/maintain CWP's in the Navy Modernization Database (NMD).

(5) Contact NAVSEA prior to starting on critical systems on all surface ships classes, per enclosure (1): SEA 05/SDM/TWH for MPDE and MRG systems; CNRMC for all other critical systems. This is not required to be on-site or face-to-face.

(6) The Commanding Officer of the NSA/RMC shall validate to CNRMC the RA's QMP wholeness prior to conduct of work on surface ship critical systems. This responsibility may not be delegated.

(7) Develop a plan to ensure all government personnel witnessing critical system check points are appropriately qualified in the areas they are assigned. Conduct internal

audits semi-annually of government personnel performing oversight on critical systems. Conduct external audits semi-annually of contractor personnel qualifications for work conducted on critical systems. Schedule additional Product Verification Inspections (PVIs) of in process work conducted on critical systems. This plan shall be part of the RTS, QMP, and/or CWP/EPCP SOP's.

(8) Ensure an appropriate, qualified RMC/SUPSHIP person is on the deck plates for all Government (G) checkpoints for all critical systems.

(9) NSA CHENG will review all proposed rework and retest plans on MPDE and MRG systems.

(10) Obtain Forces afloat concurrences as required by this instruction.

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ALL SHIPS CLASS CRITICAL SYSTEMS**

**See notes at end of this enclosure for specific systems' boundary definition

Main Reduction Gear (MRG)*
Main Reduction Gear (MRG) L/O System*
MRG Coupling/ Clutches*
Shafting and Bearing Systems *
Steering Systems

*Requires NSA CHENG to notify SEA 05 and TWH prior to starting and upon completion of work on these systems

LSD- 41/49 & LPD-17

Main Propulsion Diesel Engine (MPDE)*
MPDE Lube Oil System*
MPDE Fuel Oil System
Ship Service Diesel Generator (SSDG)
SSDG Lube Oil System & Pedestal Bearings
SSDG Fuel Oil System

*Requires NSA CHENG to notify SEA 05 and TWH prior to starting and upon completion of work on these systems

PC-1/MCM-1 CLASS CRITICAL SYSTEMS

Main Propulsion Diesel Engine (MPDE)*
MPDE Lube Oil System*
MPDE Fuel Oil System
MMGTG L/O System* (MCM Only)
MMGTG F/O System (MCM Only)
SSDG Diesel Engines (MCM Only)
SSDG L/O System & Pedestal Bearings

*Requires NSA CHENG to notify SEA 05 and TWH prior to starting and upon completion of work on these systems

DDG-51/CG-47/LHD-8/LHA-6 CLASS CRITICAL SYSTEMS

GTM Lube Oil *
GTM Fuel Oil System
GTG Fuel Oil Systems
SSDG Engine (LHD-8/LHA-6 Only)
SSDG Lube Oil (LHD-8/LHD-6 Only)
SSDG Fuel Oil (LHD-8/LHA-6 Only)

*Requires NSA CHENG to notify SEA 05 and TWH prior to starting and upon completion of work on these systems

LPD-4/LHA 1-5/LHD 1-7/LCC-19 CLASS CRITICAL SYSTEMS

(Main Steam/Level I Systems CWP requirements are covered in JFMM)

Main Boiler*
HP/LP Turbines*
Turbine LO System*
SSTG/EDG Engines

*Requires NSA CHENG to notify SEA 05 and TWH prior to starting and upon completion of work on these systems

LCS CLASS CRITICAL SYSTEMS

Main Propulsion Gas Turbine Engine (GTM)*
GTM Lube Oil/Synthetic Lube Oil System*
GTM Fuel Oil System
Main Propulsion Diesel Engine (MPDE)*
MPDE Lube Oil System*
MPDE Fuel Oil System
Ship Service Diesel Generator (SSDG)
SSDG Lube Oil System & Pedestal Bearings
SSDG Fuel Oil System

*Requires NSA CHENG to notify SEA 05 and TWH prior to starting and upon completion of work on these systems

FFG-7 CLASS CRITICAL SYSTEMS

GTM Lube Oil/Synthetic Lube Oil System*
GTM Fuel Oil System
Ship Service Diesel Generator (SSDG)
SSDG Lube Oil System & Pedestal Bearings
SSDG Fuel Oil System

*Requires NSA CHENG to notify SEA 05 and TWH prior to starting and upon completion of work on these systems

System Boundaries

MPDE/SSDG/GTM Fuel Oil Systems: Boundary includes but stops at the F/O Filter. For diesels, the boundary of the fuel oil return line is at the connection point to the engine's fuel rail or injectors, as applicable.

MPDE/SSDG/GTM and MRG Lube Oil Systems: Boundary includes the external L/O circuits, but not the L/O storage tanks/filling systems

GTM/GTGs: Boundary is those items inside the gas turbine module plus the intake/exhaust plenums and resilient mounts.

LHA/LHD/LPD Boiler- Mechanical boundary of boiler pressure vessel (headers/drums) and pressure vessel piping begins at the feed inlet of the economizer and ends at the stops for the main (superheater) and auxiliary (desuperheater) steam outlets, HP and LP drains and vents. Boiler foundations/sliding feet end at the deck connections. The exhaust gas outlet ends at the connection flange above the economizer.

LHA/LHD/LPD- HP/ LP Turbines: Mechanical boundary stops and includes the flexible coupling at the turbine drive flange

LHA/LHD/LPD- HP/ LP Turbines and Main Reduction Gear (MRG) L/O System: Mechanical boundary begins at the lube oil sump suction piping and ends at the inlet flange connections to the main reduction gear housing. *The lube oil sump is also an integral part of the main reduction gear housing.

LHA/LHD/LPD- MRG and Couplings: Mechanical boundary begins at input to the flexible coupling drive flange and ends at the output shaft of the second reduction gear.

MPDE's/SSDG's on MCM's: Mechanical boundary includes but stops at the flywheel; foundation includes and stops at the engine rail. Air boundary includes but stops at the Air Filter on the intake side and includes but stops at the turbochargers at the exhaust side. For controls, the boundary includes but stops at the governor actuator.

MPDE's on PC's: Mechanical boundary includes but stops at the flywheel; foundation includes and stops at the engine rail. Air boundary includes but stops at the Air Filter on the intake side and includes but stops at the turbochargers at the exhaust side. For controls, the boundary includes but stops at the governor actuator.

MPDE's on LPD-17/LSD-41/49: Mechanical boundary includes but stops at the Gieslinger Coupling; foundation includes but stops at the engine chocks. Air boundary includes but stops at the shutdown valve (flapper valve) on the intake side and includes but stops at the turbochargers on the exhaust side. For intercoolers, the boundary includes both the air side and water side of the intercooler. For controls, the boundary includes but stops at the governor (LSD-41) or the machinery control interface (commonly known as the "blue box") (LPD-17).

LPD-17 SSDGs: Mechanical boundary includes but stops at the flywheel; foundation includes and stops at the resilient mounts. Air boundary includes but stops at the Air Filter on the intake side and includes but stops at the turbochargers at the exhaust side. For controls, the boundary includes but stops at the governor actuator.

LSD-41 SSDGs: Mechanical boundary includes but stops at the Thomas Coupling; foundation includes and stops at the resilient mounts. Air boundary includes but stops at the Air Filter on the intake side and includes but stops at the flex coupling on the exhaust side. For controls, the boundary includes but stops at the governor actuator.

SSDG's on LHD8/LHA6: Mechanical boundary includes but stops at the flywheel; foundation includes and stops at the resilient mounts. Air boundary includes but stops at the Air Filter on the intake side and includes but stops at the turbochargers at the exhaust side. For controls, the boundary includes but stops at the governor actuator.

SSDG's on FFG7: Mechanical boundary includes but stops at the flywheel; foundation includes and stops at the resilient mounts. Air boundary includes but stops at the Air Filter on the intake side and includes but stops at the turbochargers at the exhaust

side. For controls, the boundary includes but stops at the governor actuator.

For LCS:
MPDE's on LCS's: Mechanical boundary includes but stops at the engine Coupling; foundation includes but stops at the engine chocks. Air boundary includes but stops at the shutdown valve (flapper valve) on the intake side and includes but stops at the turbochargers on the exhaust side. For intercoolers, the boundary includes both the air side and water side of the intercooler. For controls, the boundary includes but stops at the governor.

SSDG's on LCS's: Mechanical boundary includes but stops at the flywheel; foundation includes and stops at the engine rail. Air boundary includes but stops at the Air Filter on the intake side and includes but stops at the turbochargers at the exhaust side. For controls, the boundary includes but stops at the governor actuator.