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CNRMC INSTRUCTION 4700.5B

From: Commander, Navy Regional Maintenance Center

Subj: GUIDANCE AND POLICY FOR SURFACE SHIP CRITICAL SYSTEMS AND OTHER WORK REQUIRING PROCESS CONTROL PROCEDURES (PCP)

Ref: (a) COMUSFLTFORCOMINST 4790.3
(b) NAVSEA Standard Items (NSI)
(c) CNRMC 7570 Ser C400/121 / NAVSEA 02 4205 Ser 02/205 Joint Memo of 3 Aug 15
(d) CNRMCINST 4720.1

Encl: (1) Critical Systems Boundary Definitions
(2) List of Non-Critical System Work Requiring PCPs

1. Purpose. To provide a consolidated list of Surface Ship Critical Systems and other work requiring PCPs as directed by references (a) and (b).

2. Cancellation. CNRMCINST 4700.5A, dated 12 June 2013, shall be superseded in its entirety by this instruction effective immediately upon approval.

3. Background. Recurring problems and persistent failures in Critical Systems on various ship classes have occurred resulting in elevated repair costs and reduced operational capability and availability. In order to reduce failures and recurrence of problems, and to comply with the requirements of reference (a), PCPs are required for those systems and processes identified in enclosures (1) and (2). In addition to the Controlled Work Package (CWP) requirements of reference (a), CWPs are required for I-Level work for those systems listed in enclosure (1).

4. Scope. Apart from the general exceptions listed below and specific exclusions of enclosure (1), this instruction applies to all maintenance and modernization work conducted within the Main Propulsion Diesel Engine (MPDE), Main Propulsion Boiler, Water Jet Steering (LCS Class only), and Main Reduction Gear (MRG) boundaries clarified in this instruction, and the work as listed in enclosure (2). This includes work executed inside

Chief of Naval Operations (CNO) Availabilities, Continuous Maintenance Availabilities (CMAV), Continuous Maintenance (CM) Periods and Emergent Maintenance (EM) Periods.

a. All PCPs shall be approved by the Naval Supervisory Authority (NSA). Critical System PCPs shall be approved by the NSA CHENG (or designated representative).

b. PCPs and CWPs shall be reused to the maximum extent possible.

c. Alteration Installation Teams (AITs) are responsible for developing PCPs when their work is to be conducted on the Critical Systems.

d. Reserve growth is authorized for use on identified Critical Systems in accordance with reference (c).

e. In emergent situations where work on a Critical System is required and the ship's operational commitments do not allow for the normal processing of a PCP/CWP, work may begin prior to formal document approval if the local NSA Commanding Officer or their designated representative provides authorization.

f. All work accomplished using PCPs and CWPs, including work completed via the emergent PCP process, shall be certified to support availability schedule.

g. A 100 percent specification review shall occur for all Critical System work in accordance with reference (d).

5. Process and Responsibilities

a. Planning

(1) The NSA Project Manager (PM) shall ensure that the appropriate Project Team (PT) members have reviewed the Type Commander (TYCOM) Availability Work Package (AWP) and identified all work on Critical Systems.

(2) The NSA CHENG (or designated representative) shall work with the NSA PM to determine if Critical System PCPs will be reused or written.

(3) All new PCPs shall be written without proprietary information to facilitate reuse.

(4) For all Critical System PCPs developed by AITs:

(a) All PCPs shall be submitted to the cognizant NSA no later than 14 calendar days after award of the AIT contract.

(b) The NSA CHENG (or designated representative) shall approve AIT submitted PCPs early enough to allow integration into and delivery of the preliminary Integrated Production Schedule (IPS).

(c) If, during Regional Maintenance Modernization and Coordination (RMMCO) check-in, the AIT does not have an NSA CHENG (or designated representative) approved PCP for planned Critical System work, the installation shall be placed on "Gatekeeper Hold". The AIT shall not start work without an NSA CHENG (or designated representative) approved PCP.

b. Execution

(1) The original job-specific PCP shall be at the job site at all times during the performance of work.

(2) Work shall be executed in compliance with the PCP, including procedure sequence. If problems occur during work execution that prevent compliance with the PCP (i.e., failure to or inability to comply), work shall stop until the problem is resolved.

c. Certification and Close-out

(1) All Critical System PCPs, including those developed during the emergent process, shall be incrementally certified by the NSA CHENG prior to underway or system operation. Some PCPs may need to remain open until successful completion of Sea Trials due to underway testing requirements. In these instances, all work except for the underway testing portion, shall be completed with all Objective Quality Evidence (OQE) submitted, approved and incrementally certified by the NSA CHENG prior to underway or system operation. Breaking PCP work into separate phases, such as production and test phases, will help in these types of situations.

(2) The NSA PM shall ensure that the appropriate PT members have reviewed the completed Critical System PCPs for completeness and compliance and shall ensure that all problems are resolved prior to submitting the PCPs to the NSA CHENG for certification. At a minimum, the Project Support Engineer (PSE)

and Technical Matter Expert (TME) assigned to the PT shall review completed Critical System PCPs prior to submitting to the NSA CHENG for certification.

(3) The NSA PSE and Integrated Test Engineer (ITE) shall ensure that PT review of completed Critical System PCPs supports work certification by providing the NSA CHENG sufficient time to review and meet Key Event schedules. A Key Event will not be certified unless all PCPs tied to the Key Event are certified or incrementally certified as appropriate.

6. Review. This instruction shall be reviewed annually and revised as necessary by CNRMC Engineering Department.

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Critical System Boundary Definitions

This list applies to the following Ship Classes: CG47, DDG51, LCC19, LCS1, LCS2, LHA1, LHA6, LHD1, LHD8, LPD17, LSD41, LSD49, MCM1 and PC1.

1. All Ship Classes

a. Main Reduction Gear (MRG) - Includes internal components (coupling, clutches and main thrust bearing). If these components are outside the MRG, they are excluded. Oil Distribution (O.D.) box removal is excluded.

b. MRG Lube Oil (L/O) System - Includes external L/O system that is a part of the MRG and the sump. The L/O purification system, storage tanks and filling system are excluded.

2. LSD41, LSD49 and LPD17 Ship Classes

a. Main Propulsion Diesel Engine (MPDE).

3. PC1 and MCM1 Ship Classes

a. MPDE.

4. LHA1, LHD1 and LCC19 Classes

a. Main Propulsion Boiler.

5. LCS Class

a. MPDE, Water Jet Steering.

6. General Exclusions

a. Computer software associated with listed equipment.

b. Flex hoses.

c. Instrumentation (pressure gages, thermometers, thermocouples).

d. Valve repairs (by-pass regulating, thermostatic control, air start distributor, exhaust, relief valves, L/O unloader valves and temperature regulating valves).

e. Attached/detached pump repairs (includes mechanical seals).

f. Fuel injectors.

g. Attached/detached fuel oil pumps.

h. Disconnect/Reconnect of boundary mechanical joints.

i. Strainers.

j. Cleaning/inspection/testing of coolers, including intercoolers.

k. Resilient mounts.

l. MRG dehumidifiers.

m. In-shop work on small items (e.g., fuel pumps, fuel injector pop tests) can be excluded at the discretion of the NSA CHENG.

n. Exhaust leak repairs, including bellows between diesel engine cylinders.

o. Maintaining System Cleanliness (NAVSEA Standard Items Apply).

7. Critical System Boundaries

a. CG47

(1) MRG

(a) The mechanical boundary begins at the input drive flange and ends at the output shaft.

(b) Includes all components within the gear case.

(c) Includes the SSS clutches, power turbine brakes, sight flow indicators (SFI), input shaft seals, turning gear, attached L/O pump drive gears, attached CRP pump drive gears, foundation bolts, MRG sump.

(d) Excludes the CPP pumps, L/O pumps, dehumidifier, turning gear motor, SFI thermometers, and all electrical components beyond the first electrical connection (cannon plug) outside of the gear case.

(2) MRG L/O System

(a) Includes the L/O cooler (oil side) and the external L/O system that is a part of the MRG.

(b) Excludes L/O pump mechanical seals, attached L/O pump, L/O cooler, gages and gage tubing from the gage back to the last mechanical connection before the MRG.

b. DDG51

(1) MRG

(a) The mechanical boundary begins at the input drive flange and ends at the output shaft.

(b) Includes all components within the gear case.

(c) Includes the SSS clutches, sight flow indicators (SFI), input shaft seals, turning gear, attached L/O pump drive gears, foundation bolts, and MRG sump.

(d) Excludes the power turbine brake, CPP pumps, dehumidifier, SFI thermometers, and all electrical components beyond the first electrical connection (cannon plug) outside of the gear case.

(2) MRG L/O System

(a) Includes the L/O cooler (oil side) and the external L/O system that is a part of the MRG.

(b) Excludes the L/O pumps, attached L/O pump, L/O cooler (seawater side), gages and gage tubing from the gage back to the last mechanical connection before the MRG.

c. LCC19

(1) Main Propulsion Boilers

(a) Includes anything subject to ASME Boiler and Pressure Vessel Code requirements and ASME Power Piping requirements, or NAVSEA S9074-AR-GIB-010/278.

(b) Includes the mechanical boundary of boiler pressure vessel (headers/drums) and pressure vessel piping from the feed inlet of the economizer to the main (superheater) and

auxiliary (desuperheater) steam outlets, HP and LP drains and vents.

(2) MRG and Couplings

(a) Mechanical boundary begins at input to the flexible coupling drive flange and ends at the output shaft of the second reduction gear.

(3) MRG Main L/O System

(a) Includes the external L/O system that is a part of the MRG.

(b) Excludes L/O pump mechanical seals, attached L/O pump, L/O cooler, gages and gage tubing from the gage back to the last mechanical connection before the MRG.

d. LCS1 & LCS2

(1) MPDEs

(a) Mechanical boundary includes, but stops at, the engine coupling.

(b) Foundation includes, but stops at, the engine chocks.

(c) Air intake boundary includes, but stops at, the shutdown valve (flapper valve).

(d) Air exhaust boundary includes, but stops at, the turbocharger outlet flange.

(e) Intercooler boundary includes both the air side and water side of the intercooler.

(f) Controls boundary includes, but stops at, the governor.

(2) Water Jet Steering System

(a) The steering and reversing gear (including the bucket assembly, cylinder rams, pins, and bearing bushings).

(b) The hydraulic boundaries includes the hydraulic power pack, pumps, valve block, steering and reversing

cylinders, all hydraulic piping external to the ship and the feedback mechanism used to indicate cylinder position.

(c) The controls boundary includes the interceptor feedback indicator harness and the mechanical position indicator feedback cables that penetrate transom and are connected to bucket assembly.

(d) Excluded - The hydraulic pump electric motor, cooling pump electric motor, hydraulic oil cooler, shock mounts, thermometers, pressure switches, alarms, transducers and gages.

e. LHA1/LHD1

(1) Main Propulsion Boilers

(a) Includes anything subject to ASME Boiler and Pressure Vessel Code requirements and ASME Power Piping requirements, or NAVSEA S9074-AR-GIB-010/278.

(b) Includes the mechanical boundary of boiler pressure vessel (headers/drums) and pressure vessel piping from the feed inlet of the economizer to the main (superheater) and auxiliary (desuperheater) steam outlets, HP and LP drains and vents.

(2) MRG and Couplings

(a) Mechanical boundary begins at input to the flexible coupling drive flange and ends at the output shaft of the second reduction gear.

(3) MRG Main L/O System

(a) Includes the external L/O system that is a part of the MRG.

(b) Excludes L/O pump mechanical seals, attached L/O pump, L/O cooler, gages and gage tubing from the gage back to the last mechanical connection before the MRG.

f. LHA6/LHD8

(1) MRG

(a) The mechanical boundary begins at the input drive flange and ends at the output shaft.

(b) Includes all components within the gear case.

(c) Includes the SSS clutches, sight flow indicators (SFI), input shaft seals, turning gear, foundation bolts, and MRG sump.

(d) Excludes the power turbine brake, CPP pumps, dehumidifier, SFI thermometers, and all electrical components beyond the first electrical connection (cannon plug) outside of the gear case.

(2) MRG L/O System

(a) Includes the L/O pumps, L/O cooler (oil side) and the external L/O system that is a part of the MRG.

(b) Excludes the L/O cooler (seawater side), gages and gage tubing from the gage back to the last mechanical connection before the MRG.

g. LPD17

(1) MPDE

(a) Mechanical boundary includes but stops at the output side of the Gieslinger Coupling.

(b) Foundation boundary includes but stops at the engine chocks.

(c) Air intake boundary includes but stops at the shutdown valve (flapper valve).

(d) Air exhaust boundary includes but stops at the turbocharger outlet flange.

(e) Intercooler boundary includes both the air side and water side of the intercooler.

(f) Controls boundary includes but stops at the machinery control interface (commonly known as the "blue box").

(2) MRG and Couplings

(a) Mechanical boundary begins at input to the flexible coupling drive flange and ends at the output shaft of

the second reduction gear.

(3) MRG Main L/O System

(a) Includes the external L/O system that is a part of the MRG.

(b) Excludes the L/O pump mechanical seals, attached L/O pump, L/O cooler, gages and gage tubing from the gage back to the last mechanical connection before the MRG.

h. LSD41

(1) MPDE

(a) Mechanical boundary includes but stops at the output side Gieslinger Coupling.

(b) Foundation boundary includes but stops at the engine chocks.

(c) Air intake boundary includes but stops at the shutdown valve (flapper valve).

(d) Air exhaust boundary includes but stops at the turbocharger outlet flange.

(e) Intercooler boundary includes both the air side and water side of the intercooler.

(f) Controls boundary includes but stops at the governor.

(2) MRG and Couplings

(a) Mechanical boundary begins at input to the flexible coupling drive flange and ends at the output shaft of the second reduction gear.

(3) MRG Main L/O System

(a) Includes the external L/O system that is a part of the MRG.

(b) Excludes L/O pump mechanical seals, attached L/O pump, L/O cooler, gages and gage tubing from the gage back to the last mechanical connection before the MRG.

i. LSD49

(1) MPDE

(a) Mechanical boundary includes but stops at the Gieslinger Coupling.

(b) Foundation boundary includes but stops at the engine chocks.

(c) Air intake boundary includes but stops at the shutdown valve (flapper valve).

(d) Air exhaust boundary includes but stops at the turbochargers.

(e) Intercooler boundary includes both the air side and water side of the intercooler.

(f) Controls boundary includes but stops at the governor.

(2) MRG and Couplings

(a) Mechanical boundary begins at input to the flexible coupling drive flange and ends at the output shaft of the second reduction gear.

(3) MRG Main L/O System

(a) Includes the external L/O system that is a part of the MRG.

(b) Excludes L/O pump mechanical seals, attached L/O pump, L/O cooler, gages and gage tubing from the gage back to the last mechanical connection before the MRG.

j. MCM1

(1) MPDE

(a) Mechanical boundary includes, but stops at, the flywheel.

(b) Foundation boundary includes and stops at the engine rail.

(c) Air intake boundary includes but stops at the air filter.

(d) Air exhaust boundary includes but stops at the turbocharger outlet flange.

(e) Controls boundary includes but stops at the governor actuator.

k. PC1

(1) MPDE

(a) Mechanical boundary includes but stops at the flywheel.

(b) Foundation boundary includes and stops at the engine rail.

(c) Air intake boundary includes but stops at the air filter.

(d) Air exhaust boundary includes but stops at the turbochargers.

(e) Controls boundary includes but stops at the governor actuator.

(f) Gearboxes are excluded.

List of Non-Critical System Work Requiring PCPs

System / Equipment	Work Definition	ESWBS	Reference
Aluminum	Welding, Fabrication & Inspection of CG-47, FFG-7, and LCS Class Aluminum	Various, Repair Specific	NSI 009-12
Bearings	Rebabbitting of bearings	Various, Repair Specific	NSI 009-115
CHT and Mogas Tanks	Certification process for establishing the following conditions; Enter with restrictions, Safe for workers, Safe for hot work	Various, Repair Specific	NSI 009-88
Cofferdams	Cofferdam Installation	121	NSI 009-77
Compressed Air Systems	Cleaning / Flushing of Compressed Air Systems, including air systems supplying air to diver life support and oxygen generating equipment	551, 592	NSI 009-107 and JFMM Vol V, Part I, Paragraph 2.2.4
Condensate System	Cleaning / Flushing of Condensate Systems	255	NSI 009-107
Crane Boundary	Repairs within Crane boundary as defined in NSTM 589	589	JFMM Vol V, Part I, Paragraph 2.2.4, and NSTM 589
Fresh & Potable Water Systems	Cleaning / Flushing of Fresh Water and Potable Water Systems	530	NSI 009-107
Fuel Oil Systems	Cleaning / Flushing of Fuel Oil System Piping	261, 541	NSI 009-107
HP/LP Steam Drains	Cleaning / Flushing of HP/LP Stream Drain Systems	534, 535	NSI 009-107
Hydraulic Systems	Cleaning / Flushing of Hydraulic Systems	556	NSI 009-107
Level I Fittings and Components	Repair by welding, brazing, machining, lapping or manufacture of Level I fittings and Components	Various, Repair Specific	JFMM Vol V, Part I, Paragraph 2.2.4
Level I Systems and Components	Manufacture, installation, and repair of Level I Systems and Components	Various, Repair Specific	JFMM Vol V, Part I, Paragraph 2.2.4

Lube Oil Systems	Cleaning / Flushing of Lube Oil Systems	12315, 23422, 262	NSI 009-107
Oxygen, Nitrogen and Helium Systems	Cleaning / Flushing of Oxygen, Nitrogen and Helium Systems	553	NSI 009-107 and JFMM Vol V, Part I, Paragraph 2.2.4
Piping	Brazing Class P-3a Special Category Piping and Fittings	Various, Repair Specific	NSI 009-12 and JFMM Vol V, Part I, Paragraph 2.2.4
Pressure Vessels and Piping	Welding Class A-F, A-1, A-2, A-3, A-LT, P-1, P-LT, M-1, and T-1 Pressure Vessels, Piping and Fittings	Various, Repair Specific	NSI 009-12 and JFMM Vol V, Part I, Paragraph 2.2.4
Propellers	Welding, Fabrication & Inspection of Propellers	245	NSI 009-12
RAST	Repair and maintenance of Recovery Assist, Securing, and Traversing (RAST) System	586, 588	JFMM Vol V, Part I, Paragraph 2.2.4
Refrigerant Systems	Cleaning / Flushing of Refrigerant Systems	516	NSI 009-107
Shafting & Rudder Stocks	Welding, Fabrication & Repair of Shafting and Rudder Stocks	243, 562	NSI 009-12
Ship's Stability	Maintaining Ship's Stability	835, 8431	NSI 009-100
Steam Systems	Cleaning / Flushing of Steam Systems	534	NSI 009-107
Titanium	Welding, Fabrication & Repair of Titanium-based Material	Various, Repair Specific	NSI 009-12
WHE	Manufacturing and repair of Weight Handling Equipment (WHE) (except for Cranes)	Various, Repair Specific	JFMM Vol IV, Chapter 13 and Vol V, Part I, Paragraph 2.2.4