



NSRP TECHNICAL PANEL SP-3

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“The Future of Navy Ship Corrosion Control Planning, Specification and Implementation”

SEA 05M1, Corrosion Control Division

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In FY03, Formal Establishment of an Office of Corrosion Policy & Oversight by Acting PDUSD (AT&L) and Designation of a DoD Corrosion Executive

- o Congressional Concern About DoD Product Approval Process, 2002
 - SEA 05M1 and Others Interviewed by GAO, Late 2002.
- o Resultant of the Section 1067 of the Bob Stump National Defense Authorization Act—Public Law 107-3144 (NDAA), enacted 10 U.S.C. 2228 (FY03)
 - Designation of an official or organization to be responsible for the prevention and mitigation of corrosion of military equipment and infrastructure.
- o Formation of the Corrosion Prevention and Control (CPC) IPT to develop strategic direction, policy and guidance to prevent and mitigate corrosion within DoD
 - CPC IPT is represented by members from OSD, Joint Staff/J-4, Army, Navy, Air Force, Marine Corps, Army Corps of Engineers, Joint Council for Aging Aircraft, NASA, and U.S. Coast Guard.

DoD Corrosion Related Audit by GOA with Focus on Acquisition and Maintenance

- o Navy Lacks Service-wide Strategic Plan
 - Navy Commands have Some Strategic Corrosion Plans.
- o NAVSEA Corrosion Prevention Activity Not a Formal Program.
 - “Lacks clearly defined goals and objectives”
 - “This office has identified cost avoidance projects and tracks the amount of savings achieved to date, but more could be done to monitor performance. For example, there was no analysis of the reasons why specific projects were proceeding at a slow pace.”

- **SECDEF to Direct that DoD's Strategic Plan Include:**
 - Standardized methodologies for collecting and analyzing corrosion cost, readiness, and safety data
 - Clearly defined goals and performance measures, including ROI
 - Identify the level of resources needed to accomplish goals and objectives
 - Establish mechanisms to coordinate and oversee prevention and mitigation projects in an inter-service and service-wide context.

- **Secretaries of each Service to Complete:**
 - Development of service-wide strategic plans that are consistent with the goals, objectives, and measures in the DoD's plan
 - Establishment of procedures and milestones to hold major commands and program offices that manage specific weapon systems and facilities accountable for achieving the strategic goals

OSD Corrosion Policy



ACQUISITION
TECHNOLOGY
AND LOGISTICS

THE UNDER SECRETARY OF DEFENSE

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WASHINGTON, DC 20301-3010

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MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS

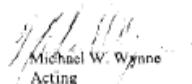
SUBJECT: Corrosion Prevention and Control

The Department of Defense (DoD) acquires, operates, and maintains a vast array of physical assets, ranging from vehicles, aircraft, ships, and other materiel to wharves, buildings, and other stationary structures that are subject to corrosion. Consequently, corrosion control contributes significantly to the total cost of system ownership. To control these costs, I believe we need to revitalize our approach to tracking, costing, and preventing or controlling corrosion of systems and structures. Specifically, we need to concentrate on implementing best practices and best value decisions for corrosion prevention and control in systems and infrastructure acquisition, sustainment, and utilization.

Basic systems design, materials and processes selection, and intrinsic corrosion-prevention strategies establish the corrosion susceptibility of Defense materiel. The early stages of acquisition provide our best opportunity to make effective trade-offs among the many competing design criteria that will provide desired Defense capability. I believe that corrosion needs to be objectively evaluated as part of program design and development activities and the inevitable trade-offs made through an open and transparent assessment of alternatives. Therefore, I want this requirement to be specifically addressed during the earliest phases of the acquisition process and by decision authorities at every level. I will personally consider this issue for programs subject to Defense Acquisition Board (DAB) Review.

I have directed that a review and evaluation of corrosion planning be a standard topic for the Integrating Integrated Product Team reviews and that the Corrosion Prevention and Control Planning be reviewed by the Overarching Integrated Product Team with issues raised by exception to the DAB. To assist all of us in designing effective strategies, corrosion prevention and control planning guidance will be included in the "Designing and Assessing Supportability in DoD Weapons Systems" guidebook. We are also drafting a "Corrosion Prevention and Control Planning Guidebook," which will provide assistance in general corrosion-control planning and the implementation of sound materials selection and treatments during the design, development, and sustainment of DoD weapons systems and infrastructure.

Thank you for your support as we develop a long-term DoD corrosion prevention and control strategy. My focal point for this effort is Mr. Daniel Dunmire, Director, Corrosion Policy and Oversight, at 703-681-3464. e-mail daniel.dunmire@osd.mil.



Michael W. Wynne
Acting

“implementing best practice and best value decisions”

“early stages of acquisition provide our best opportunity”

DAB... “review and evaluation of corrosion activities planning”

“Corrosion Prevention and Control Planning Guidebook”

- ✓ Applicable for Use by all DoD Program Offices
- ✓ Definition of Better Requirements
 - Acquisition Reform Left Some Services Without Adequate Performance Specifications
 - Specifications Will Be Reviewed
 - Minimal Impact on NAVSEA
- ✓ Establishment of Major Elements to Corrosion Prevention and Control Program:
 - Corrosion Prevention Advisory Team (CPAT) – Monitors Contractors Corrosion Team (CCT) and Drafts Corrosion Prevention and Control Plan (CPCP)
 - Materials and Process Considerations in Design
 - Submission Schedule
- ✓ Insertion of Technical Authority as CPAT member

- ✓ DFARS Change Notice 20040917
 - On 17 SEP 2004, Office of the Director of Defense, Procurement and Acquisition Policy published changes to DFARS regarding corrosion control be incorporated in the acquisition process.
 - “Acquisition Plans – Corrosion Prevention and Mitigation (DFARS Case 2004-D004): Adds corrosion prevention and mitigation to the areas that agencies must address in acquisition plans. This change implements Section 1067 of the National Defense Authorization Act for Fiscal Year 2003, which requires DoD to prevent and mitigate corrosion during the design, acquisition, and maintenance of military equipment.”

- ✓ NAVSEA Instruction Implementing DFARS Change Submitted for Signature by SEA 00

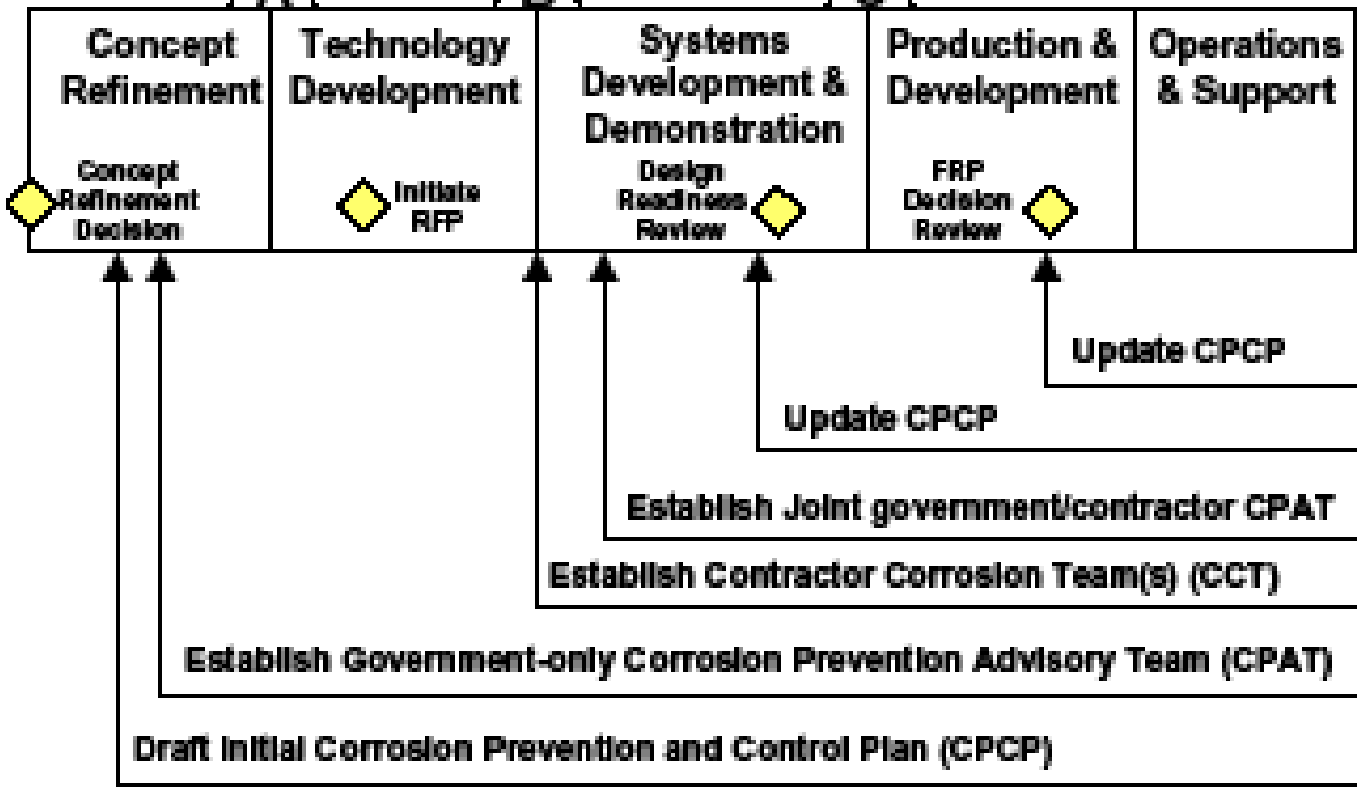
Corrosion Planning Part of Acquisition Strategy

User Needs & Technology Opportunities

ICD → CDD → CPD →

- Process entry at Milestones A, B, or C
- Entrance criteria met before entering phase
- Evolutionary Acquisition or Single Step to Full Capability

Source: DoD Inst 5000.2



As noted in the Corrosion Prevention and Control (CPC) Planning Guidebook, Section 2.0



OSD Implementation Issues

- GAO Performing Investigation on Implementation of Policy
- Program Offices – Resource Limited & Schedule Restricted
- Staffing of 26 Design Teams and 6 Major shipbuilding Programs at NAVSEA
- Material Selection Reviews (MSR's) – Reviewed and Approved by SEA 05M
- QA/QC Process – Workforce & Organizational
- Additional Training & Certification Requirements
 - Inspectors, Blasters & Applicators and Technologists
- Investment In Implementation of Modern Coatings and Processes – This Need Echoed by Fleet

- ❑ *In Early FY04, NAVSEA (05M1) briefed the Defense Science Board (DSB) twice to discuss NAVSEA's role in Transitioning Corrosion Control Technology to the Fleet.*
- ❑ *DSB reported the Results of their Review to OSD (June 2004).*
 - ✓ With a Few Exceptions (such as the Navy Nuclear Program), Leadership does not give much regard to Corrosion.
 - ✓ DoD Personnel most in need of Training are Acquisition Professionals.
 - ✓ Better Metrics and Cost Accounting for Corrosion are needed.
 - ✓ Corrosion Executives for each Service should be established.

Steps To Meet DFAR

- ❑ **Consider Corrosion Prevention and Control (CPC) planning a key issue in designing, procuring and maintaining a DoD system or facility**
 - CPC planning should feature:
 - Management Planning
 - Technical and Design Considerations (requirements, tradeoffs, etc.)
- ❑ **Establish a Corrosion Prevention Advisory Team (CPAT)**
 - Along with the Contractor Corrosion Team (CCT), CPAT guides the direction of CPC Planning
- ❑ **Implement a CPC Plan**
 - Plan needs to be established early in a Program/Project
 - Effects of Corrosion need to be considered in the Initial Phases of the Acquisition Cycle
 - Implemented no later than Milestone B for the Case of Weapon Systems
 - Plan shall describe how the Program/Project will implement CPC Planning
 - Requirements for the Establishment of the CPAT and CCT
 - Specify the detailed finish and coating systems to be used in accordance with CPC Plan approved specifications and standards
 - Development of environmental test and verification plans
 - Ensure CPC at the component and assembly levels, as well as at the system level
 - Guidance for development of corrosion technical manuals and maintenance concepts

ABS-NVR for New Construction

- **Corrosion control Part 8 Chapter 4 developed and included in ABS-NVR**
 - **Defines the following as Critical Coated Areas:**
 - **Underwater hull and appendages;**
 - **All tanks and voids**
 - **All bilge areas**
 - **Freeboard/superstructure**
 - **Exterior surfaces and appurtenances thereto**
 - **All intake vent plenums and trunks between the skin of the ship**
 - **All uptake spaces**
 - **Well deck overheads**
 - **Helicopter deck RAST track troughs or their equivalent**
 - **High traffic interior decks**
 - **Decks to which non-skid coating will be applied.**

ABS-NVR for New Construction_(cont)

➤ Corrosion Prevention and Control Plan

The Shipbuilder or Design Agent shall prepare a Corrosion Prevention and Control Plan (CPCP) for review and approval by ABS and the Naval Technical Authority within six months of contract award. The CPCP shall describe corrosion prevention design management and design review activity, and production and construction measures that will be implemented.

At a minimum, the CPCP shall provide the following information:

- (1) The organization, procedures, and responsibilities for a Contractor Corrosion Team (CCT).
- (2) Roles and responsibilities of Quality Assurance, Process Control, Production Operations, Manufacturing Planning, Procurement, Environmental Compliance, Personnel Safety and other contractor organizations for the corrosion prevention effort.
- (3) Discussion and identification of the various degrees of the corrosion environment anticipated for different areas of the ship (e.g., continuously or periodically immersed in seawater or other fluids, exterior/weather exposed, interior wet or humid spaces), and designation of corrosion-prone areas, compartments, systems, sub-systems, and components based on their degree of exposure to these environments.

ABS-NVR for New Construction_(cont)

- (4) Description of a corrosion design review process for the above designated corrosion-prone areas and equipment. The design review process should include factors such as:
 - i. Materials of construction in their as-fabricated condition (including welds, residual stresses, etc.) and their suitability for the expected environment.
 - ii. Design detail factors such as dissimilar metal corrosion in wetted areas, crevice corrosion, etc.
 - iii. Known corrosion problems experienced on identical or similar equipment or systems used on prior Naval ships in similar service corrosion environments.
 - iv. Planned maintenance philosophy, including dry-docking and maintenance availability cycles.
 - v. Accessibility for inspection and maintenance.
 - vi. Impact of topside rust formers on crew maintenance workload.
 - vii. Selection of materials for installation hardware, miscellaneous outfitting hardware, and the specification of various corrosion preventive treatments such as fastener thread treatments, sealants, electrical connection weatherproofing, corrosion inhibitors, organic and inorganic coatings. In the selection of corrosion prevention methods, consider periodic maintenance actions that may be required to inspect and renew installed corrosion preventive measures, and whether any specialized training is required for the crew.
- (5) Description of how the results of the design review process above will be documented and tracked, in order to allow for iterative reviews as the design matures and changes.
- (6) Specification of corrosion preventive measures to be taken for specific areas, compartments, systems, and components, via installation and interface corrosion control drawings or other contract production documents.
- (7) Specifications (process/finish specifications in systems) detailing application of coatings and other corrosion prevention compounds (if any). These process instructions should address personnel training and qualification, material inspection, surface preparation, and coating or compound application procedures. The CPCP should address only those materials and processes intended to be used.

ABS-NVR for New Construction_(cont)

- (8) How the Contractor will assure vendor and subcontractor compliance with the CPCP.
- (9) Corrosion control measures to be used for the installation of any Government-Furnished Equipment (GFE) in designated corrosion prone areas.
- (10) Any test data developed, or to be developed, for coatings or other corrosion related materials and processes.

The CPCP shall take into account currently approved and/or qualified materials, environmental regulations, personnel safety requirements and ship service life evolution as stated in the Acquisition Specification.

Throughout the contract, the CPCP shall be maintained and updated by the Contractor, and resubmitted for review by ABS and the Naval Technical Authority, as required to record changes to materials and processes being used for corrosion prevention and control.

The DoD Corrosion Prevention and Control Planning Guidebook (Spiral No. 1) provides guidance on corrosion control planning.

ABS-NVR for New Construction_(cont)

➤ Coating Process Control Procedures

The Shipbuilder or Design Agent shall prepare and submit for review and approval by ABS and the Naval Technical Authority Process Control Procedures (PCP) for critical coated areas defined in 1.2. The procedures shall be submitted six months prior to the construction of the portion of the ship containing the applicable critical coated area(s). The procedures shall contain the following minimum information:

- a. Contractor's name and address.
- b. Process title, number, and date developed.
- c. Description of process, including critical factors which have direct bearing on the process quality and safety.
- d. Qualification requirements for the personnel performing the work.
- e. Inspection and documentation forms.
- f. Acceptance and rejection criteria for checkpoints.
- g. The method utilized to ensure personnel accomplishing the procedure have direct knowledge of the requirements prior to beginning work.
- h. A matrix that describes the entire job process with planned start dates, surface preparation dates, coating application dates, etc. This matrix shall be updated weekly, as needed, based on schedule changes, until completion / closure of each space or job item.
- i. The method utilized to control the procedure.
- j. Approval signature and title of the contractor's representative and the date of submission.

ABS-NVR for New Construction_(cont)

- ❖ ABS-NVR invoked for the LCS Class.
 - ✓ PCP's have been developed
 - ✓ A corrosion control plan is being generated
 - ✓ HSNC rules vs. ABS-NVR rules at issue