ENCLOSURE 1

Summary of FY 19 Changes to Standard Item 009-32, "Cleaning and Painting Requirements; accomplish" and Associated Technical Rationale for Each Change

The following provides the rationale for the substantive changes proposed for the FY-19 Standard Item 009-32. The specific changes discussed below appear highlighted and in **bold** in the attached final draft of the FY-19, Standard Item 009-32. Minor editorial changes, re-numbering, and other administrative changes do appear in the attached final draft of the FY-19, Standard Item 009-32 in **bold**, but are not highlighted and not discussed below.

1. CHANGE: Retention of "as-arrived" intact, adherent coatings on non-ferrous piping one inch in diameter or less: The current, FY-18, Change 1, Standard Item 009-32, paragraph 3.1.4.3 requires that non-ferrous piping one inch in diameter or less not be prepared or painted. This requirement was updated to permit the retention of adherent coating on these smaller pipes that represents an "as-arrived condition."

RATIONALE: The current, FY-18, Change 1, Standard Item 009-32, paragraph 3.1.4.3 requirement intent is that non-ferrous piping one inch in diameter or less is not to be surface prepared or coated because surface preparation inherently creates a risk of damaging the piping, the piping is inherently corrosion resistant and as such does not require coating, and the inherently small surface area of the piping will not cause appreciable galvanic corrosion of coated steel structures. The paragraph 3.1.4.3 intent and requirement are technically sound, but waterfront managers report some small piping is found to be painted when ships arrive for recoating work. The proposed change to allow retention of "as arrived," pre-existing coatings on small non-ferrous piping is consistent with the intent of the current requirement in that any hand work required to remove intact, adherent coating will inherently create the same risk of damaging the smaller piping as any other surface preparation or coating process. Thus, the change reduces risk of damage to the piping during coating removal and reduces the overall tank recoating cost by eliminating the labor currently expended on careful hand work to scrape paint off small diameter nonferrous piping.

2. CHANGE: Standardization of nonskid system component terminology for consistency throughout Standard Item 009-32: Universal changes have been incorporated throughout the FY-19, Standard Item 009-32 to standardize the terms nonskid primer, nonskid, color topping, and the overall term nonskid system. These changes appear throughout the document and are first cited in paragraph 3.1.5.

RATIONALE: The use of consistent terminology between surface ship and submarines will reduce the risk of growth work associated with inconsistent terminology that did lead to an ESR on Moored Training Ship work at NNSY in 2017. In addition, use of consistent, clear terminology across platforms is in accordance with the Joint Fleet Maintenance Manual (JFMM) Volume VII, Chapter 4, Appendix E, "Procedures for the Preparation and Use of Work Item Specifications for Ship Repair." Thus, for submarines and surface ships the following are the consistent terms:
"Nonskid system" is defined as the entire coating system including nonskid primer, nonskid, and color topping.

“Nonskid primer” is defined as the epoxy primers used under nonskid and/or tie downs that are applied directly to the steel/aluminum/GRP deck.
“Nonskid” is defined as the rough, aggregate loaded, dark gray coating applied with a nap-less roller or spray system directly over the nonskid primer.
“Color topping” is defined as the colored paints that are applied to tie downs, deck edges and directly to nonskid to create Visual Landing Aid (VLA) markings as part of the overall “nonskid system.”
By citing the “nonskid system” to cover all the coatings applied to complete a nonskid deck, there will be less waterfront confusion during deck installations supporting timely completion of the work. Thus, the standardization of the nonskid system terminology across all platforms will reduce costs by eliminating work package ambiguity.

3. CHANGE: Clarification of the order of precedence of references within the Standard Item**:** Added a new paragraph 3.1.13 to clearly state that the requirements of the Standard Item take precedence over all referenced documents where there is a conflict.

RATIONALE: The addition of paragraph 3.1.13 does not alter technical requirements, but rather clarifies the order of precedence of the requirements to be consistent with the JFMM, Volume V, Part I, that lists the order of precedence for maintenance documentation. However, the JFMM is silent on industry standards such as the ASTM F718s that are referenced in Standard Item 009-32 and define the requirements for coating cure times, overcoat windows, and other important coating application parameters. NAVSEA policy for the past seven years has been that coating manufacturers report the capabilities of their products on their ASTM F718 forms, without defaulting to the requirements appearing in Standard Item 009-32. As a result, ASTM F718s will frequently allow coatings to be applied at lower temperatures, or at higher relative humidities, or in thinner layers, etc. than required in Standard Item 009-32. For example, by adding paragraph 3.1.13, NAVSEA has clarified that even if an ASTM F718 says a specific tank coating can be applied at up to 85% relative humidity, the Standard Item 009-32 requirement to apply the coating at less than 50% relative humidity takes precedence. Thus, the addition of paragraph 3.1.13 will not alter job cost or coating performance because it simply clarifies existing policy.

4. CHANGE: Added new requirement to ensure coating container integrity and legibility of labels**:** Added a new a new paragraph, 3.1.15 to ensure that coating containers are intact and that their labels are legible at the time of coating application.

RATIONALE: PSNS reported contractors were applying nonskid coatings from coating containers (e.g., 5 gallon buckets) that are damaged or that had illegible labels, making government oversight of the materials difficult. For example, the can labels show the expiration date of the coating and if the label is illegible, expired coatings could be applied to Navy ships. Standard Item 009-32 appendices require the recording of information from can labels and illegible labels prevent completion of the appendices. By requiring coating containers to be free of damage and that all labels remain legible at the time of coating application, the government oversight staff can verify that the specified coatings are being applied and that the coatings are within their specified shelf life, reducing the risk of a nonconforming coating being applied to a flight deck and contributing to the risk of aircraft engine FOD. The change will not alter cost and will reduce the risk of improper or expired coatings being applied to Navy ships.

5. CHANGE: Standardization of the nomenclature "peel and stick nonskid"**:** Throughout the document, the term "slip-resistant deck coverings," and other terms for MIL-PRF-24667, Type XI, Composition PS (i.e., peel and stick), materials, were replaced with the term "peel and stick nonskid." The first change appears in paragraph 3.1.27 and is replicated throughout the document to include removal of the term "slip-resistant deck covering" from Note (71).

RATIONALE: The consistent use of the term "peel and stick" nonskid throughout Standard Item 009-32 will align the terminology in the requirements document with the waterfront vernacular, and the MIL-PRF-24667 composition designation. The terminology change does not alter the technical requirements. For example, both MIL-PRF-24667 and NSTM 634 use the term "peel and stick nonskid" to describe the MIL-PRF-24667, Type XI, Composition PS material. In previous revisions of Standard Item 009-32, the term "slip resistant deck covering" was used to describe the same material based on archaic ship new construction specification terminology. This inconsistency has caused confusion within the technical community and is not in accordance with the JFMM, Volume VII, Chapter 4, Appendix E requirement for use of consistent nomenclature in Standard Items. Thus, the change improves document clarity, complies with the JFMM, and will not alter either costs or material performance.

6. CHANGE: Clarification of cleaning requirements prior to coating removal**:** Updated paragraph 3.1.32.1 to clarify that a visual water break test may be used to validate both SSPC-SP 1 and NACE/SSPC-SP WJ-2 cleanliness.

RATIONALE: The update to paragraph 3.1.32.1 clarifies that the optional waterbreak test may be used to verify SSPC-SP 1 and NACE/SSPC-SP WJ-2 surface cleanliness to ensure that surfaces are free of visible oil and grease before recoating. In previous Standard Item 009-32 revisions, the waterbreak test was only called out for use to verify that SSPC-SP 1 "solvent cleaning" had created an oil/grease-free surface. However, because previous Standard Item 009-32 revisions also allowed the waterjet cleaning process to be conducted without first conducting the SSPC-SP 1 "solvent cleaning" process, allowing a waterbreak test to verify cleanliness reduces the risk of oil/grease contamination degrading subsequent coating adhesion from areas subject to waterjet cleaning. Thus, the change will allow oversight activities to require the waterbreak test on NACE/SSPC-SP WJ-2 surfaces to verify cleanliness, reducing the risk that inadequate workmanship would allow contamination to remain on a surface or flight deck. The change reflects a lesson learned from thermal spray nonskid application in which oil/grease has been found to penetrate through nonskid cracks onto the deck. The change does not require any additional time or oversight during coating application, but rather provides another tool quality oversight personnel can use to ensure compliance with the current requirements. Because oil/grease contamination on the deck can degrade nonskid system adhesion, oversight activities that use the waterbreak test to verify flight deck cleanliness will reduce the risk of nonskid delamination contributing to aircraft engine FOD.

7. CHANGE: Addition of "flight deck nonskid" to paragraph 3.6.1.5: Added "Flight deck nonskid" to paragraph 3.6.1.5 to exempt these areas from the current requirements and documentation waiver for small, less that two square foot, "new and disturbed areas."

RATIONALE: Because of the time/cost required to maintain environmental conditions to conduct extremely small repairs on coatings, paragraph 3.1.6.5 was added to the FY-10 Standard Item 009-32 in 2008 to allow coating damage to very small areas (e.g., less

than two square feet) to be repaired without creating the otherwise required coating application conditions. For example, based on this paragraph, a surface ship ballast tank that was coated at 50% relative humidity and chipped by workers during final tank close-out could be immediately touched up at ambient humidity/temperature instead of requiring days to reinstall dehumidification equipment and re-establish the 50% relative humidity. For the example tank, the risk that the small areas of coating repairs conducted at ambient conditions would not perform effectively was considered low simply because the areas were so small. It is important to note that this allowable relaxation in requirements never applied to reserve feedwater or similar tanks on submarines and carriers. Based on observations by CNSP N42 on both the USS ESSEX (LHD 2) and USS WASP (LHD 1) flight decks, contractors installing deck lights applied nonskid too rapidly to about a square foot of area around the lights. Because the application requirements were waived, the small areas "mud cracked" and as such would be likely to degrade more rapidly than the surrounding nonskid increasing the risk of aircraft engine FOD. CNSP N42 tasked the nonskid in the small areas to be repaired because any chips or flakes of delaminating nonskid can cause aircraft engine FOD. To reduce this risk in the future, the proposed change will eliminate the small areas waiver of installation requirements for flight deck nonskid repairs. The change may result in an increase in costs because applicators will have to follow requirements even in small areas of the flight deck, but the surface and carrier TYCOMs concur that the resulting slight increase in nonskid repair application costs will reduce the risk of aircraft engine FOD risk.

8. CHANGE: Included Collective Protection System (CPS) intake vent plenums on the critical coated area list**:** Updated paragraph 3.7 to include ". . . Collective Protection System (CPS) intake vent plenums . . ." in the table of critical coated areas.

RATIONALE: Attachment 1 shows the NSWC-PD ISE advisory (241400Z 2013, ISEA 019-13) that identifies DDG 51 class ships' CPS fan room ventilation intakes as an area that always exhibits corrosion and frequently exhibits enough material loss to create considerable weld repair growth work. To reduce the amount of growth work and extend the service life of coatings in these areas, SURFMEPP recommended adding the areas to the critical coated list. CPS fan room ventilation intakes do satisfy the definition of critical coated areas in NSTM 631 and because adding the areas to the critical coated area list will reduce the risk of growth work in the future, the SSRAC working group endorsed the change. Thus, the increase in government oversight of coating applications in the CPS fan rooms associated with listing these areas in paragraph 3.7, will result in some increase in costs in the near term, but will help future availabilities remain on schedule and within budget.

9. CHANGE: Standardization of length of time required for environmental readings**:** Updated paragraph 3.10.1.4 to require environmental readings be recorded beginning at "the surface preparation acceptance checkpoint." This update brings paragraph 3.10.1.4 into alignment with paragraph 3.10.1.5.

RATIONALE: This change does not alter the technical requirements but instead aligns the requirement language of 3.10.1.4 with pre-existing language in paragraph 3.10.1.5 of FY-18, Change 1, Standard Item 009-32 and creates more consistent requirements in accordance with the JFMM, Volume VII, Chapter 4, Appendix E goal of consistent requirements in Standard Items. The change stems from reports from waterfront government oversight managers of confusion on the waterfront as to when contractors

were required to start environmental readings and how long they are required to continue taking readings throughout the coating curing process. To clarify the intent of the requirement, the statement "from the surface preparation acceptance checkpoint" was added to enhance requirement consistency and improve clarity. Thus, the proposed change will not increase costs and will simplify contractor interpretation of the requirements.

10. CHANGE: Clarification of intent of requirement for "manual readings" as related to use of environmental data loggers**:** Updated paragraph 3.10.1.6 to specify that manual readings (e.g., with devices like a sling psychrometers, thermometers, etc.) shall be taken ". . . with a separate calibrated device independent of the data-logger."

RATIONALE: Government oversight staff report that the paragraph 3.10.1.6 requirement regarding manual environmental readings at (G)-points is interpreted differently by some contractors. The requirement has been interpreted by some contractors as requiring a visual inspection that data-loggers are in place without actually verifying that the units are taking measurements during the process (i.e., many data loggers do not include an LED display and require data to be downloaded to a computer to be viewed). The intent of the requirement for periodic manual readings that was added to the FY-06, Change 2, Standard Item 009-32 in 2006 was to validate environmental data during the job to allow validation of final data logger data (i.e., data loggers that were not calibrated or functional would be identified). For example, government oversight staff in 2006 expressed concern that computerized downloading of data might not reflect actual conditions in tanks due to measurement or transcription errors and that is why the manual verification was added to the requirements. Government oversight staff in 2017 expressed that manual environmental readings taken an intervals throughout the coating application process are still required to validate that the data-logger measurements are accurate and allow more timely government response to deviations from environmental conditions because the government does not have computers that will directly access the contractor's data loggers on the job site. Thus, the change will not increase costs because the requirement has been in place since 2006, but will clarify to all contractors that government oversight staff require validation of the environmental conditions to support rapid response to deviations in environmental conditions.

11. CHANGE: Standardization of minimum profile requirement following SSPC-SP 11 on surface ships and submarines**:** Paragraph 3.10.5.2 was updated to remove the requirement that SSPC-SP 11 power tool cleaning of surfaces on submarines achieve a lower minimum surface profile than that required on surface ships and aircraft carriers.

RATIONALE: The SSPC-SP 11 "Power Tool Cleaning to Bare Metal" surface preparation requirement has required a minimum surface profile of 1 mil for decades. Because higher surface profiles promote enhanced coating adhesion, NAVSEA updated the FY-09, Change 1, Standard Item 009-32 in 2008 to require 2 mils of surface profile in critical coated areas to enhance coating service life in areas like tank closures and the underwater hull that are power tool cleaned as part of tank close out. In 2008, the submarine community requested that submarines retain the 1 mil requirement. At the annual submarine preservation meeting held in Washington DC on 21 March 2017, the submarine technical community determined that a minimum 2 mil profile could be readily accomplished in areas subject to SSPC-SP 11 power tool cleaning with little risk of adversely affecting the substrate structure. To reduce confusion in Naval

shipyards that work on both carriers and submarines, and to improve coating performance over areas subject to power tool cleaning, the exclusionary sentence in paragraph 3.10.5.2 for submarines was deleted. Thus, the change will result in a negligible increase in costs because modern power tools can readily create 2 mils of profile, and the change will streamline waterfront production by maintaining a consistent requirement on submarines, surface ships, and carriers.

12. CHANGE: Reserve feedwater, potable water and fresh water drain tanks are exempted from conductivity and chloride measurements on submarines and aircraft carriers**:** Updated paragraph 3.10.6 to exclude potable water, reserve feedwater, and freshwater drain collecting tanks on submarines and aircraft carriers from conductivity or chloride measurements. The change also eliminated the government oversight checkpoint for conductivity/chlorides. Paragraph 3.10.9.4 is also updated to exclude the same from visual inspection for chloride contamination.

RATIONALE: Because the water in the potable water, reserve feedwater, and freshwater drain collecting tanks is inherently extremely low in chlorides and other ionic contaminants, Naval shipyards observed that the required surface conductivity/chloride measurements historically did not produce results that "failed" Standard Item 009-32 requirements for immersion service. So, the rationale for the change was that if surfaces are never contaminated, why test to prove they are not contaminated. Specifically, PSNS and PNSY reviewed their historical data on surface conductivity/chloride measurements and found the yards had completed 416 conductivity checkpoints since 2012 on feedwater, potable water, and freshwater drain tanks on CVNs, SSNs, and SSBN/SSGNs. Of these 416 conductivity checkpoints, 173 checkpoints were conducted on submarines and none failed the checkpoint (i.e., none of the readings showed conductivity in excess of the required 30 µS/cm). Additional data review showed the average conductivity readings from these submarine checkpoints was ≈16 µS/cm (i.e., the data collected were well below the requirement). The remaining 243 conductivity checkpoints were conducted on CVNs with only two checkpoints identifying conductivity in excess of the required 30 µS/cm. Both high conductivity readings were from hull cut areas that the shipyards reported were not handled in accordance with the cleanliness standards used in the tanks. The shipyards report the hull cuts plates are currently being handled using enhanced cleanliness standards. Given that the nonconforming measurements make up <0.5% of all the conductivity measurements from two shipyards since 2012, and that there is an inherently low risk of contamination in these "clean" water tanks, the SSRAC meeting group concurred with deleting the requirement. The SEA 05P2 Technical Warrant Holder for Coatings and Corrosion Control rates the risk of eliminating the conductivity test resulting in high conductivity contaminants remaining on a tank surface and leading to premature blistering in a reserve feedwater, potable water, or freshwater drain collecting tank as LOW. The complete elimination of the conductivity/chloride test requirement for these tanks will lower the represervation costs by 13 manhours for each 4,500 square foot tank or ≈ 0.5 manyears/year at Naval Shipyards. Because the change relates to thanks under SEA 08 cognizance, SEA 05P2 defers to SEA 08R to determine if the conductivity/chloride test and associated (G) checkpoint can be removed from requirements for coating the potable water, reserve feedwater, and freshwater drain collection tanks. SEA 05P2 is working with SURFMEPP to collect similar data from potable water tanks coated by contractors on

surface ships and if the results are similar, will update the surface ship potable water tank coating requirements in the FY-20 Standard Item 009-32.

13. CHANGE: Waiver of SSPC-SP 1 requirement for tie-downs undergoing NACE/SSPC-SP WJ-2**:** Added a new paragraph 3.11.3.4 that waives the initial requirement for SSPC-SP 1 solvent cleaning of flight deck and hangar bay tie-downs prepared to SSPC-SP 2, 3, or 15 when the final stage of surface preparation process is in accordance with NACE/SSPC-SP WJ-2 very thorough waterjet cleaning.

RATIONALE: The requirement to achieve a clean, oil/grease free surface as defined in SSPC-SP 1 prior to hand or power tool cleaning of tie-downs is being removed when these areas are to undergo very thorough waterjet cleaning to NACE/SSPC-SP WJ-2. The proposed change is consistent within the requirements already appearing in FY-18, Change 1, Standard Item 009-32 paragraph 3.10.2. Paragraph 3.10.2 has been included in Standard Item 009-32 since the 2006, FY-08 update and states: "For areas prepared to NACE/SSPC-SP WJ-2 of 2.5 and 2.10 with UHP WJ equipment, the requirement of initial degreasing/cleaning is waived." The waiver was included because allowable processes in SSPC-SP 1 "solvent cleaning" include aqueous steam and detergent cleaning and as such a waterjet process will inherently remove oil/grease in a manner similar to that required for SSPC-SP 1. The intent of the new paragraph 3.11.3.4 is to enhance consistency between tie-down surface preparation and surface preparation on the rest of the deck, even when the tie downs are hand or power tool cleaned prior to undergoing waterjetting. The SEA 05P2 Technical Warrant Holder for Coatings and Corrosion Control rates the risk of eliminating the SSPC-SP 1 solvent cleaning requirement resulting in oil/grease contaminants remaining on a tie-down surface after very thorough waterjet cleaning leading to premature failure of tie-down coatings as LOW. The low risk is further mitigated because as discussed in Change 6 above, government oversight staff may require a waterbreak test on any suspicious deck or tie down areas. Thus, the new paragraph 3.11.3.4 clarifies an existing requirement, eliminates an unnecessary degreasing task and associated government checkpoint, and is estimated to reduce the time required to coat tie downs by 0.25 manhours per tie down or ≈ 1,250 manhours for a complete carrier flight deck.

14. CHANGE: Nonskid stripe coat requirement moved from Note (51) to Paragraph 3.11.8.2**:** Moved the current Note (51) requirement that allows for the use of a second full coat of nonskid primer to satisfy the stripe coat requirement to paragraph 3.11.8.2 to improve clarity and eliminate an entire historical category of DFSs.

RATIONALE: The change both relocates and existing requirement and clarifies an issue that has been subject to a number of DFSs over the years. Specifically the new paragraph includes the current, Note (51) statement that a second coat of nonskid primer may be applied if approved by the SUPERVISOR. This provision has been invoked on a number of LHD flight decks to address high surface profiles and is known to reduce the risk of deck corrosion. In addition, the new paragraph 3.11.8.2 includes the following clarification sentence:

"The second full coat satisfies the stripe coat requirement."

That second sentence has been subject to multiple DFSs over the years because carrier elevators and many LHD decks have exhibited high profiles that the SUPERVISOR has addressed by requiring a second primer coat. Because a second full coat of primer inherently adds additional coating over the welds on the deck (i.e., that is the intent of the required to be stripe coat), NAVSEA signed out a precedent setting DFS (i.e.,

CVN-70-1054-2012) in 2012 that allowed retention of high profiles on aluminum CVN aircraft elevators because of the low risk of coating delamination. The DFS included comments on the use of a second coat of primer as a means of reducing corrosion risk and that the second full coats inherently satisfies the stripe coat requirement. Because the change is broadly applicable to all nonskid jobs, the item was moved from the notes that must be cited piecemeal in specific tables/lines to a general provision that is automatically invoked on all jobs. Thus, the change does not alter existing requirements and will not increase costs, but will avoid the NAVSEA labor associated with having to adjudicate DFSs from ships other than carriers (i.e., surface ships are not covered by the 2012 precedent setting DFS) that may elect to use a second of primer and would have to contact NAVSEA to determine if the second coat did, or did not, address the stripe coat requirement.

15. CHANGE: Defines that qualified inspectors will conduct required URO MRC 003 structural inspection**:** Updated both paragraphs 4.7.2 and 4.7.3 to remove the requirement that the government perform the URO MRC 003 structural inspection. These paragraphs now specify that URO MRC 003 inspections shall be carried out by "an inspector qualified in accordance with URO MRC 003."

RATIONALE: The Unrestricted Operations (URO) Maintenance Requirement Cards (MRC) program was developed by NAVSEA to monitor specific areas of submarines to ensure the material conditions remain adequate for continued unrestricted operations. URO MRC 003 defines the requirements for inspectors authorized to perform the associated structural inspections. The current, FY-18, Change 1, Standard Item 009-32 requirement for the government to conduct the URO MRC 003 structural inspections contradicts the requirements laid out in the current URO MRC program requirements documents that do authorize qualified, non-government staff (e.g., at Electric Boat and HII Newport News Shipbuilding) to conduct such inspections. Because non-government shipyard personnel are authorized to accomplish URO MRC 003 inspections in accordance with the requirements specified in the URO MRC program, paragraphs 4.7.2 and 4.7.3 were modified to cite "qualified" inspectors. Thus, the change does not alter requirements and ensures consistency between Standard Item 009-32 requirements and URO MRC program requirements.

16. CHANGE: Added Attachments D and E that provide improved graphics and more clear requirements for installation of spray-applied dielectric shield materials**:** Added new Attachments D and E that describe the detailed procedures required for installation and repair of spray-applied dielectric shields.

RATIONALE: The requirements for installing spray-applied dielectric shields were originally added to the 2010, FY-12, Standard Item 009-32 following positive results from an FY-08 Office of Naval Research, Technology Insertion Program for Savings project that projected annual savings from use of spray applied anode shields as $434.5K/year when a CVN was in dock and all shields were being replaced. The two new Attachments D & E were added to provide more clear graphics than those in the current simple Figure 3 in the FY-18, Change 1, Standard Item 009-32; explain the requirements for different shield sizes associated with different ship classes; and better define application requirements. Attachment D defines the requirements for spray shield application when an anode is installed and Attachment E provides analogous requirements when an anode is retained. Since 2012, spray-applied dielectric shields have been shown to reduce the or risk of shield-penetrating holidays and inherently

provides a smooth finish that does not require final hand sanding as was the case historically with the original, trowel applied shield materials. The first application of spray dielectric shields was accomplished in 2008 on the USS HIGGINS (DDG 76). The DDG 76 shields have been in service for 9 years and the Jan 2017 diver inspection report showed that all of the spray-applied dielectric shields were intact and adherent. Thus, the spray applied shield material is on track to meet and may exceed the service life of the current trowel-applied materials which would result in both application costs savings (i.e., it is less costly to spray apply a coating that to apply a coating with a trowel) and reductions in total ownership costs associated with extended shield service life.

17. CHANGE: Removal of non-definitive language from Note (7) requirements**:** Updated Note (7) to remove the non-definitive term "compatible."

RATIONALE: The Note (7) update uses the previously defined term "nonskid system" to refer to a complete, qualified nonskid decking system that includes the color topping that were subject to the term "compatible" that was removed from the note. Historically the term compatible was used because some nonskid manufacturers allowed color topping from other manufacturers to be applied to their nonskid. The non-definitive term can be removed because over time nonskid manufacturers have found that all color toppings perform effectively on all nonskids. These observations lead to the definitive requirements of Note (19) which that state:
"MIL-PRF-24667 nonskid systems shall be applied as a complete system from the same manufacturer. The use of another manufacturer's MIL-PRF-24667 color topping is authorized."
These basic Note (19) requirements have been in Standard Item 009-32 since at least the FY-01 update published in 2000 and NAVSEA has not encountered any cases of color toppings failing to adhere to nonskid in the past 17 years. In addition, the change is in accordance with JFMM, Volume VII, Chapter 4, Appendix E, requriements that Standard Items must be written with definitive work requirement language and must avoid the use of non-definitive language. Thus, the proposed change does not alter technical requirements, should not change costs, and improves document clarity.

18. CHANGE: Clarification of authorized coatings for peripheral deck edges**:** Updated Note (22) to clarify that peripheral deck edging and areas not receiving nonskid may be coated with either MIL-PRF-24667 color topping or a MIL-PRF-24635, Type V/VI, polysiloxane coating.

RATIONALE: The change is intended to ensure that the more wear resistant, color stable, MIL-PRF-24635, Type V/VI, polysiloxane coatings are required for use on decks just as these coatings are being required for use on other topside areas. NAVSEA is in the process of updating all topside coating requirement to eliminate the use of the older, MIL-PRF-24635, Type III silicone alkyd coatings and the Note (22) change is consistent with that policy. The requriements to apply only MIL-PRF-24635, Type V/VI, polysiloxane coatings are being updated because the Fleet is observing a four-fold improvement in topside coating service life and color stability associated with the use of polysilxone coatings that lowers total ownership cost. The Change 25 discussion shown below also provides additional rationale regarding the Fleet's transition to required use of only the Type V/VI, polysiloxane topside coatings. Thus, the change to Note (22) will increase the cost of coating materials applied to deck edges because polysiloxane coatings are typically more than double the cost of silione alkyds on a per

gallon basis. However, because the material costs represent only 20% of the overall cost of a paint job, extending the deck edge service life to avoid even one recoating cycle over the ship service life will reduce total ownership costs. The approach also improves commonality by requiring all topside coatings including those used on decks to be qualified to MIL-PRF-24635, Type V/VI polysiloxane materials.

19. CHANGE: Reorganization of workmanship requirements in separate note to clarify applicability of penetrating primers for application to heavily pitted areas within the tables: The current requirements to use Sherwin-Williams Fast Clad primer and International THA787/785 penetrating primers in heavily pitted areas was removed from Note (24) and added as new Note (46) to separate the primer applicability from the general note on high-solids, single-coat paint workmanship.

RATIONALE: The current, FY-18, Change 1, Standard Item 009-32, Note (24) included requirements related to single-coat paint workmanship and includes the requirement to use the Sherwin-Williams Fast Clad penetrating primer / International THA787/785 penetrating primer on "heavily pitted areas." Unfortunately, the workmanship requirements in Note (24) were being cited throughout the Tables/Lines for virtually all single-coat systems, including the unique, qualified coatings used in potable water tanks and well deck overheads, even though the two primers for use on heavily pitted areas are not qualified for such service. To clarify that the requirements to use the two primers for heavily pitted surface was only applicable to exterior surfaces above the boottop, ballast tanks, and fuel tanks and was not applicable to potable water tanks, well deck overheads or other specialized areas, the primer guidance was pulled out of Note (24) and added as a new, separate Note (46). As shown in the new, FY-19, Standard Item 009-32, Note (46) is only referenced for exterior surfaces above the boottop, ballast tanks, and fuel tanks. The remaining workmanship requirements in Note (24) were retained and remain applicable to all high-solids, single-coat installations including potable water and well deck overheads. Thus, the change reduces the risk of unqualified coatings being installed in potable water tanks, but otherwise does not alter coating installation requirements and as such should not increase costs.

20. CHANGE: Require application of inorganic zinc silicate coatings in accordance with commercial data sheets**:** Added a new Note, (51), that requires application of inorganic zinc silicate coatings in accordance with the coating's commercial data sheet or ASTM F718.

RATIONALE: Inorganic zinc silicate coatings were required to be used in CVN water brake tanks in the FY-18, Change 1, Standard Item 009-32 to ensure consistency with CVN new construction contract requirements. The inorganic zinc silicate coating system in these tanks reduces the risk of epoxy paint chips impeding equipment operations because the significant pressure fluctuations inherent in these tanks during flight operations promotes cracking over all coating systems. Historically, because of high material costs and persistent overcoat blistering issues, NAVSEA removed call outs for inorganic zinc coatings from NSTM 631 in 2001 and does not maintain specifications or qualified products lists for inorganic zinc silicate coatings. Because NAVSEA does not qualify these coatings, the product specific application requirements are not cited in the FY-18, Change 1, Standard Item 009-32. In cases where products are not qualified to military specifications, NAVSEA requires coatings to be installed in accordance with either commercial technical data sheets or the more NAVSEA-

specific ASTM F718 product data sheets. To clarify that inorganic zinc coatings are required to be installed in accordance with manufacturer's instructions, Note (51) was added to the FY-19 Standard Item 009-32. By citing Note (51) in the Tables/Lines, any application of inorganic zinc coatings will have to be conducted in accordance with manufacturer's instructions in the form of a manufacturer's technical data sheet or an ASTM F718. Thus, the change will resolve deck plate quality assurance issues by more clearly defining application requirements and will reduce the risk of inorganic zinc coatings failing prematurely due to improper application, without appreciably altering overall job costs.

21. CHANGE: Updated Notes (70) and (86) to retain requirements for use of archaic MIL-PRF-24635, Type III silicone alkyd coatings: As discussed further in Change 26 below, NAVSEA is requiring the use of the more durable, color stable, MIL-PRF-24635, Type V/VI, polysiloxane coatings on ship topsides and Notes (70) and (86) were updated to allow the archaic MIL-PRF-24635, Type III, silicone alkyd coatings to be used only in touch up applications.

RATIONALE: Change 25 below discusses why NAVSEA is requiring use of the more durable, color stable, MIL-PRF-24635, Type V/VI, polysiloxane coatings on ship topsides to reduce total ownership costs by reducing the frequency of topside coating repair/replacement because of color shifting, fading, or mechanical breakdown. As noted in the discussion, MIL-PRF-24635, Type V/VI, polysiloxane coatings are appreciably more costly on a per gallon basis than the older, MIL-PRF-24635, Type III, silicone alkyd coatings and as such the intent of the new Note (70) is to continue to allow touch up of the lower cost silicone alkyd coating with the lower cost coating. For example, a ship with a silicone alkyd topside coating that is scheduled for decommissioning in a year should not be repaired/repainted with the more costly polysiloxane system. However, because the ship still does need to maintain their coating system over the remaining operational service life, work planners invoking Note (70) will reduce costs by not paying to install a long service life coating on a ship that will be decommissioned in the near term. Similarly, Note (86) was added to allow carriers to continue using Type III silicone alkyd coatings to touch up or repair topside coatings. Such an approach lowers carrier total ownership costs in the near term because the new construction contract for the USS GERALD R. FORD (CVN 78) still requires application of MIL-PRF-24635, Type III silicone alkyd coatings and the long range maintenance plan does not address recoating the topside until 2025. As such, touch-up of the silicone alkyds on the CVN 78 with more costly polysiloxane coatings would not increase overall topside coating service life based on the current maintenance plan, but would appreciably increase material costs associated with touch up tasks. Thus, the changes to Notes (70) and (86) will reduce total ownership costs by allowing use of the low cost, silicone alkyd paint when such low cost paint will support ship service life expectations and maintenance planning.

22. CHANGE: Clarification of surface preparation requirements listed in Note (78)**:** Added the term "tightly adherent paint" to Note (78) to clarify that SSPC-SP 3 surface preparation is only acceptable for areas with tightly adherent paint.

RATIONALE: When Note (78) was added to FY-17, Change 1, Standard Item 009-32 in 2016, the intent was to address the precedent on aircraft carriers to reduce coating installation costs without degrading coating service life by defining bilge transitions areas between those requiring the existing coating to be removed and replaced and those where the

"as arrived" coatings can be retained and simply color matched to the areas where the complete coating system will be replaced. The approach to defining these areas was defined in the approved DFS CVN71-NNS129-10 from 2010 and cited that the bulkheads above the bilge were specifically called out as low risk because they typically arrive with a tightly adherent coating system as compared with bilge areas subject to periodic immersion that typically showed degraded coating that required complete removal and replacement. Tightly adherent paint is defined in SSPC-SP 3 as paint that cannot be removed by lifting with a dull putty knife. Because the "as arrived" existing coating above the bilge is intact and adherent, SSPC-SP 3 surface preparation in these areas was deemed low risk to overall performance of the new coating system and was the basis for CVN bilge coating work. Government quality assurance staff have observed that since Note (78) was adopted in the FY-17 Standard Item 009-32, that SSPC-SP 3 has been applied to all areas 12 inches and above the bilge regardless of existing coating condition. The result has been coatings applied over areas with known, failed coating, after only the limited power tool cleaning required by SSPC-SP 3 instead of the SSPC-SP 11, power tool cleaning to bare metal required in Standard Item 009-32 for use in bilges. Thus, the change clarifies the intent of the current requirements by limiting the use of SSPC-SP 3 surface preparation only in areas of tightly adherent paint. The change will reduce life cycle costs by extending the service life of the overall bilge coating system and should not appreciably increase costs because the change simply clarifies the intent of existing requirements.

23. CHANGE: Note (84) added to permit the use of low temperature coatings when the tank substrate temperature cannot be maintained above 50 degrees Fahrenheit**:** Added Note (84) to define that use of low temperature coatings is required when substrate temperatures cannot be maintained above 50F.

RATIONALE: Note (84) has been added and cited in multiple Tables/Lines for tanks that cannot achieve the required 50F steel substrate temperature when a ship is in the water, in the winter, and the surrounding seawater is less than 50F. PSNS staff have worked for years to develop processes to coat CVN "skin" tanks while the ship is in the water and have found that no achievable amount of heating of the ventilation air entering a "skin" tank can heat the steel adjacent to the cold seawater enough to raise all tank surfaces above 50F. Examples of tanks that will be coated using Note (84) include some CVN JP-5 tanks, surface ship fuel/contaminated fuel tanks, DDG 51 fuel service tanks, sumps, dirty drain collecting tanks, some bilges, oily waste tanks, chain lockers and some non-floodable and floodable voids. The low temperature coatings are qualified to MIL-PRF-23236, Type VII and citing the Note (84) in the Tables/Lines will expand the original application of these coatings which were historically only permitted in ballast tanks and floodable voids to far more tanks. The low temperature coatings are to be applied in accordance with the NAVSEA reviewed ASTM F718s and the other general requirements in Standard Item 009-32. NAVSEA has no reports of previous installations of low temperature coatings in tanks failing prematurely. The SEA 05P2 Technical Warrant Holder for Coatings and Corrosion Control rates the risk of allowing low temperature coatings to be applied to additional types of tanks resulting in premature coating failure allowing corrosion and adversely affecting ship structure as LOW. Note (84) is not applicable to reserve feedwater, potable water, or freshwater drain collecting tanks. Adding Note (84) to Standard Item 009-32 is considered essential to the Carrier Planning Activity (CPA) overall tank maintenance strategy to support carrier overall service life goals (i.e., shipyards report they cannot

coat enough tanks during drydockings to support the notional 50 year CVN service life). Historically, carriers did not maintain coatings throughout their service life and recently decommissioned carriers had multiple areas with perforations in ship structure due to corrosion associated with a lack of tank/void maintenance coatings over 40 to 50 years of service. By adding Note (84), the Navy will expand the ability to coat tanks while ships are in the water, expanding ship operational availability and avoiding growth work during drydocking; all without adding any more than a LOW level of risk that coatings applied to low temperature steel will fail prematurely and allow ship structure corrosion.

24. CHANGE: Require DDG 1000 class ship topsides to be light gray**:** Added Note (85) that requires DDG 1000 class ship topside be light gray instead of the haze gray color used on other ships in the Fleet.

RATIONALE: The NAVSEA S6360-AG-MAN-010 "Camouflage Manual for Surface Ship Concealment" requires the use of haze gray (i.e., as defined by SAE-AMS-STD-595, Color Number 26270) coatings on ship topsides as the optimal color ". . . for use day or night in all seasons or geographical areas." Because haze gray is the optimal color, the Standard Item 009-32 topside coating requirements for all surface ships and carriers requires application of haze gray paint to freeboard, superstructure, islands, and masts. However, the DDG 1000 class ship new construction contract, Section 631, Painting, Rev. V, 25 September 2013, requires the use of light gray (i.e., as defined by SAE-AMS-STD-595, Color Number 26373) rather than haze gray for the entire ship topside. For further information about the technical basis for this atypical new construction topside color requirement, please contact SEA 05D2 (Higgins). Both SEA 05D2 (Higgins) and NAVSEA 05P1 (Yi) concur with the proposed requirement in Note (85) to use light gray on DDG 1000 class topsides in Jul/Aug 2017. Thus, the change in topside color for DDG 1000 class aligns new construction requirements and does not alter in-service coating application requirements and as such is not anticipated to increase coating costs. Because light gray is an atypical color for U.S. Navy ship topsides, waterfront work planners must be aware of the Note (85) requirements and must inform contractors that ordering large volumes of light gray paint to repair/replace coatings on DDG 1000 class ships may require appreciably more lead time than ordering similar volumes of haze gray paints.

25. CHANGE: Extending expected service life of MIL-PRF-24647 Type I coatings from 3 years to 7 years.**:** Updated Table One, Lines 3 and 16 to add MIL-PRF-24647 Type I coatings to the category of "up to 7 year" service life antifouling coatings based on recent product qualification.

RATIONALE: MIL-PRF-24647, Type I, copper-free antifouling coatings have been qualified as "Application 1" coatings to support up to 3 years of service life since 2008 and have performed effectively on Navy, U.S. Coast Guard, and Military Sealift Command ships. NSWC-CD, Code 613 monitored demonstration installations of these coatings on USS LABOON (DDG 58), two US Army LCUs, USCG SHRIKE (WPB-87342), and USNS MILLINOCKET (EPF3) for more than 3 years of service. NAVSEA tracks the performance of antifouling coatings for more than 3 years to provide the technical data needed to qualify the coatings for up to 7 years of service (i.e., NAVSEA has never required antifouling qualification testing for the full service period because that would result in qualification of some products taking more than twelve years). Similarly, coating performance is tracked for more than 7 years to

provide the technical basis for qualifying coatings for 12 years of service. Because environmental regulations are being increased on copper-bearing coatings, West Coast shipyards can reduce costs and compress schedules by using Type I, copper-free antifouling coatings. For example, PSNS can avoid 7,600 manhours of labor to rig a drydock to contain copper-bearing antifouling overspray. Thus, by expanding the number of ships that can be coated with Type I, copper-free antifouling coatings by citing the qualified coatings for up to 7 years of service in Table One, Lines 3 and 16, West Coast shipyards will be able to reduce costs by 7,600 manhours per docking and speed antifouling coating application tasks on more (i.e., and typically larger ships and submarines).

26. CHANGE: Replacement of MIL-PRF-24635, Type III, silicone alkyd coatings with Type V/VI, polysiloxane coatings**:** Throughout the document, requirement to apply MIL-PRF-24635, Type III, silicone alkyd coatings to topsides have been replaced with requirements to apply MIL-PRF-24635 Type V/VI, polysiloxanes coatings. For example, Table 2, Lines 5-8 have been made redundant to Lines 1-4, and have been removed. Table/Line numbers have been updated accordingly. In addition, Notes (70) and (86) discussed in Change 21 above have been added to define the limited remaining applications for the silicone alkyd coatings to be used to touch up silicone alkyd coatings.

RATIONALE: The Fleet is transitioning to the more durable, color stable MIL-PRF-24635, Type V/VI, polysiloxane coatings to reduce total ownership costs by extending the service life of topside coatings and avoid the expenses associated with frequent topside coating repair/replacement. Even though the MIL-PRF-24635 Type V/VI, polysiloxane coatings are typical three or four times more expensive per gallon than the MIL-PRF-24635, Type III silicone aklyd coatings, the overall installation job costs are not as high as might be anticipated because the thick, durable polysiloxane coatings provide a level of corrosion protection analogous to that provided by the epoxy primer and as such polysiloxane coatings are applied to steel substrate over only one coat of epoxy primer while silicone alkyd coatings are applied over two epoxy primer coat. One fewer primer coat reduces labor costs, partially mitigates the increase in material costs, and can help compress schedule. Polysiloxane coatings also exhibit an increased service life due to their color stability and increased durability extending the intervals between the required topside repair/recoating periods. Based on these performance attributes, NRL conducted a controlled assessment of the maintenance cost avoidance that can be achivieved from large-scale installations of polysiloxane coatings. The results from a demosntration installation of the polysilxone coatings on USS MAHAN (DDG 72) showed that over a two year deplyment cycle, the ship's force and maintenance team expended 78% fewer manhours to maintain the polysilxone on the starboard side of the ship as compared with the manhours expended to maintiain the silicone alkyd coating on the port side. These results were briefed to SEA 00 and SEA 21 in July 2017 and the leadership decision was to complete the Fleet transition from the use of silicone alkyds to the use of polysiloxane coatings by completing the changes to the FY-19 Standard Item 009-32. The change requires the use of polysiloxane coatings by eliminating the Table/Line citations for the silicone alkyd coatings that appear in the FY-18, Change 1, Standard Item 009-32. NAVSEA will continue to support the Fleet transition to polysiloxane coatings with a planned, FY-18 task to update the NSTM 631 technical manual to cite the required processes for cleaning and maintaining the MIL-PRF-

24635, Type V/VI, polysiloxane coatings. When the NSTM 631 update is complete, NAVSEA will remove silicone alkyds from the SHML and eliminate Notes (70) and (86) from a future Standard Item 009-32. Thus, the change to require use of only polysiloxanes on surface ship topsides will reduce topside coating maitnenance requirements by 78% on ships that are fully coated with polysiloxane and these savings will more than offset the increased costs of the polysiloxane paint on a per gallon basis as compared with the low costs of the silicone alkyd coatings.

27. CHANGE: Addition of liquid coating touch up procedure for fluidized bed powder coated louvers**:** Added a new Line 35 to Table 2 to define requirements for touch-up of fluidized bed powder coated DDG Gas Turbine Bolted Air Intake and Exhaust Louvers.

RATIONALE: The fluidized bed powder coating process required for DDG gas turbine louvers has extended louver coating service life by three fold as compared with electrostatic powder coating or simple liquid spray coatings. However, fluidized bed powder coating is an heavy industrial process conducted at a limited number of CONUS facilities. Fluidized bed powder coating application process requires louvers to be removed from the ship, transported to and from the coating facility, and then reinstalled on the ship. In the FY-18, Change 1, Standard Item 009-32, there is no in-situ or pier-side repair process for powder coated louvers beyond the limited topside coating repair processes conducted by ship's force in accordance with NSTM 631. CNRMC has chaired a powder coating working group for the past five years that has been working to extend the service life of powder coated louvers by avoiding processes that damage or chip the coatings. Process improvements implemented to date include requiring installation of plastic washers to prevent the stainless steel mounting nuts from crushing the powder coating around the holes in the louver flange, adding pivot washers to access doors in the louvers, and developing a liquid coating repair process that would offer superior performance to a ship's force touch up. An improved liquid coating repair process is essential because currently, louvers with >90% intact, adherent powder coatings are being returned to the fluidized bed powder coating facility for recoating because of running rust from the areas with chipped or damaged powder coating. Based on the working group efforts, the new Table 2, Line 35 requirements define in-situ, high-solids, liquid coating louver repairs processes that will prevent running rust and extend louver service life. The high-solids liquid coating repairs will not offer the same service life as undamaged powder coating, but will prevent running rust for more than three years and far out perform the ship's force touch up coating repair service life. The appreciable benefit of the repair process is apparent if one considers a DDG with running rust from louvers that is forward deployed in Japan. Based on FY-18, Change 1, Standard Item 009-32 requirements SRF JRMC would have to take the louvers with running rust from small areas of chipped/damaged powder coating off of the ship and send them back to CONUS for complete replacement of the powder coating. The new Table 2, Line 35 requirement will allow SRF JRMC to conduct a liquid repair on the powder coated louvers pier-side at a reduced costs and on a far short schedule. Thus, the new Table 2, Line 35 requirements will reduce costs by allowing in situ repair of powder coated louvers that will avoid the major (e.g., ≈$600K/ship set) expense associated with shipping the louvers to the powder coating facility for recoating, and will help ship maintenance availabilities remain on schedule by eliminating the time required to ship louvers to and from the powder coating facility.

28. CHANGE: Nonskid primer required to be applied to aluminum substrate hangar decks, flight decks and vertical replenishment deck areas within 6 hours of surface preparation: Added a new requirement to Table 2, Line 40 that requires nonskid primer to be applied to the aluminum substrate within 6 hours of surface preparation.

RATIONALE: SWRMC reported that some nonskid on LCS 2 class ship decks was delaminating in just over a year. Although the qualified service life of the MIL-PRF-24667, Type I nonskids is only one year, SWRMC experience with Type I nonskids on steel decks is that the coatings can readily provide two or more years of service life. SWRMC has expressed concerns that the relatively thin aluminum on the LCS 2 flight deck will be damaged in the future by repeated, annual waterjet cleaning and shot blasting that would be required to replace nonskid that is not remaining adherent to the deck for more than a year. To address these concerns, an established requirement to limit the time that aluminum surfaces can remain exposed to the atmosphere before antifouling coating primer application from the FY-18, Change 1, Standard Item 009-32, Table One, Line 11 was incorporated into the Table 2, Line 40 nonskid requirements. The antifouling coating primer to aluminum time limit has been in Standard Item 009-32 since at least 2000 and NAVSEA has not experienced any significant antifouling primer to aluminum adhesion issues over the past 17 years. Adding a 6 hour time limit between aluminum deck surface preparation and primer application will improve epoxy primer adhesion because whenever aluminum is exposed to the atmosphere, a thin layer of oxides/hydroxides forms on the surface that are extremely difficult to see with the unaided eye. The oxide/hydroxide layer is not optimal for promoting adhesion between the aluminum and epoxy primers and that is why NAVAIR still specifies chromic-acid based conversion coatings for aluminum surfaces before they apply epoxy primers. Because the oxide/hydroxide film thickness grows as a function of time, and is difficult to observe with the unaided eye, a time limit is the only means of limiting layer thickness before epoxy primer application. For example, iron also forms an oxide layer when exposed to the atmosphere and this red/brown oxide layer is readily visible. In fact, it is the color and consistency of the visible iron oxide layer that is the basis for all the NACE/SSPC-SP WJ-2/M or WJ-2/L flash rust requirements in Standard Item 009-32. Thus, the intent of adding a 6 hour limit between aluminum surface preparation and epoxy primer application is to extend the service life of nonskid on LCS 2 class ships and avoid the expense associated with future deck repairs due to metal loss over 20 years of service. In addition, improved nonskid service life will also reduce the risk of delaminating nonskid causing aviators to decertify the flight deck. Note that because of the inherent operational heat limits associated with aluminum flight decks, the LCS 2 class ships will not operate the fixed wing aircraft that have experienced aircraft engine FOD from delaminating nonskid.

29. CHANGE: Clarification of requirements for wet space decks not receiving other deck coverings**:** Updated multiple citations in Table 3 that previously required application of high durability deck coating qualified to MIL-PRF-32171 to require high durability deck coatings qualified to the new MIL-PRF-32584 specification published on 1 Aug 2017.

RATIONALE: The changes to Table 3 are primarily editorial in that the requirements for applying the high durability deck coating qualified to MIL-PRF-32171 already appeared in Standard Item 009-32 and the update simply cites the same high durability deck coatings qualified to the new MIL-PRF-32584 specification that was published on 1 Aug 2017. The MIL-PRF-32584 specification was created to co-locate requirements

for all interior, monolithic deckings (i.e., deckings that arrive in a can as a liquid material that is then applied to a deck) in one, single specification. Thus, the performance requirements for high durability deck coatings in MIL-PRF-32171 were transposed into the Type I and II categories for high durability deck coatings qualified to the new MIL-PRF-32584 specification. In addition, Table 3, Lines 3 and 5 were updated to allow a primer coat of conventional MIL-PRF-23236 coatings that provide outstanding corrosion control performance and that have been used on interior decks for decades to be overcoated with a topcoat of MIL-PRF-32584, Type I or II that includes requirements for coefficient of friction and wear resistance. By authorizing the combination of MIL-PRF-23236 primer under an abrasion-resistant MIL-PRF-32584 deck coating, the service life of the overall system can be enhance in spaces that are frequently wet (e.g., sanitary spaces, fan rooms, water closets, etc.). Thus, the change does not increase costs because the same high durability deck coatings qualified to MIL-PRF-32171 are qualified to the new MIL-PRF-32584 specification and by adding an option to apply the high durability deck coatings over the effective MIL-PRF-23236 primers, the change provides enhanced overall system corrosion control performance that will reduce life cycle costs in wet spaces.

30. CHANGE: Increase in allowable temperature limits for MIL-DTL-24441, Type IV coatings**:** Updated Table 5, Lines 17 and 18 to increase the upper temperature limit for machinery substrate temperatures to which MIL-DTL-24441, Type IV coatings can be applied from 200F to 250F and correspondingly increased the lower temperature limit for application of the heat resistant PSX 892HS coating.

RATIONALE: PSNS requested that the maximum allowable substrate service temperature for MIL-DTL-24441, Type IV coatings cited in FY-18, Change 1, Standard Item 009-32, Table 5, Lines 17 and 18 be increased to allow for more effective color coding of hot parts in CVN bilges (i.e., the PSX 892HS heat resistant coating was not available in any colors other than gray, aluminum, and black, while the MIL-DTL-24441, Type IV coatings are available in 14 different colors). Figure 1 provides the technical basis for the 200F maximum substrate temperature limit that had been in Standard Item 009-32 since the the FY-14, Change 1 update in 2013. As shown in Figure 1, 200F was selected because the MIL-DTL-24441, Type IV coatings exhibited appreciable color change at temperatures as low as 300F-350F and general industry technical experience with conventional epoxy coatings was that they could be used on substrates with operating temperatures between 200F and 300F. Thus, the current, 200F requirement was conservative, understanding that the color shifts apparent in Figure 1 occurred in 8 hours. PSNS agreed that the appreciable color shift in MIL-DTL-24441, Type IV coatings above 300F to 350F did suggest a risk of long-term coating degradation if MIL-DTL-24441, Type IV coatings were applied to such hot substrates. However, PSNS also reported that many of the bilge areas that require color coding did not operate above 250F. Based on the limited color change shown in Figure 1 for MIL-DTL-24441, Type IV coatings at 250F, NAVSEA concurred that increasing the allowable temperature range to 250F would streamline carrier bilge coating work without appreciably increasing the risk of MIL-DTL-24441, Type IV coatings color shifting or otherwise failing prematurely. PSNS did request that NAVSEA update the current NSTM 631 that was last updated in 2008 and that does allow MIL-DTL-24441, Type IV coatings to be applied to substrates with operating temperatures up to 400F. SEA 05P2 concurred with the request. As shown in Figure 1, any MIL-DTL-24441, Type IV coating applied to areas that operate at 400F would demonstrate

appreciable color change in 8 hours of service and would likely degrade and fail prematurely. Thus, the change will reduce costs by allowing CVN maintenance activities to expand the population of hot substrate areas to which the multiple colors of low-cost MIL-DTL-24441, Type IV coatings can be applied without appreciably increasing the risk of the coating color shifting or failing prematurely. Updating NSTM 631 to reflect the most current technical policy in Standard Item 009-32 will also enhance requirement commonality. SEA 05P2 has initiated an NSTM 631 update task using Paint Center of Excellence funding in FY-18.

30. CHANGE: Added Note (44) to expand coating system options for Aircraft Electrical Servicing Stations (AESS) trunks**:** Updated Table 5, Line 34 to include a reference to Note (44) to expand AESS trunk coating requirements to include the solvent-bearing, MIL-PRF-23236, Type VI epoxy coatings specified for use on carrier flight deck areas like barricade stanchions and jet blast deflector wells.

RATIONALE: Note (44) that defines requirements for coating AESS has been cited in some form in Standard Item 009-32 since 2003. Over the period, Note (44) has been cited in Tables/Lines for machinery and bilge coating requirements have evolved over time to cite high-solids, single-coat and other high performance bilge coatings. In the current, FY-18, Change 1, Standard Item 009-32, Table 3, Lines 10 to 14 bilge coating citations do not include the solvent-based, legacy epoxy coatings still used on CVN flight deck areas like barricade stanchions and jet blast deflector wells that are frequently touched-up by ship's force. In addition, all of the current bilge coating citations require a final coat of interior, fire-resistant paint such as the MIL-PRF-24596 acrylic or the MIL-DTL-24697 chlorinated alkyd to match the surrounding color. Note (44) has been added to the Table 5, Line 34 to require the AESS trunks to be coated with the same conventional, solvent-bearing, MIL-PRF-23236, Type VI epoxy coatings, in the same colors, used on other similar carrier flight deck areas (e.g., jet blast deflector pits, stanchion wells, etc.). The change provides an option to match the appearance of the coatings in other, similar carrier flight deck areas and eliminates the requirement to apply a final coat of interior, fire-resistant acrylic or chlorinated alkyd coatings that are intended for color matching on interior bilges and are unimportant on exposed areas of AESS trunks on the flight deck. Note (44) is still cited in the bilge and machinery coating requirements appearing on Table 3, Lines 10 to 14, and the change simply adds an optional, simplified coating system that will offer an equivalent level of performance to coatings on flight deck areas that experience a similar service environment like barricade stanchions and jet blast deflector wells. Thus, the change will reduce costs by providing an option for use of conventional, solvent bearing, MIL-PRF-23236, Type VI coatings on AESS trunks in the same way other, similar carrier flight deck areas are coated.

31. CHANGE: Clarification of note applicability**:** Updated the title column of Table 8, Lines 1 to 3, to cite Note (29A) that establishes relatively humidity requirements to ensure consistent citation of the requirement throughout the potable water tank coating process.

RATIONALE: This change does not alter technical requirements, but rather is intended to resolve ambiguity regarding the timing of the 50% relative humidity requirements in Note (29A) through the coating production process. Specifically, Note (29A) is cited in FY-18, Change 1, Standard Item 009-32 only in Column A that is used to define surface preparation requirements. Waterfront quality assurance staff reported confusion

during the potable water coating application process since the note clearly indicates environmental requirements are applicable throughout the entire represervation process (i.e., to include coating cure) but were only cited in the surface preparation column. The change clarifies that the intent of the requirement is to apply the established 50% relative humidity requirements appearing in Note (29A) to the entire represervation process and not simply to the surface preparation process. Thus, the change does not alter technical requirements, will reduce ambiguity on the waterfront, and as such should have either no impact or a slight reduction in potable water tank coating job costs.