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AMERICAN SOCIETY FOR TESTING AND MATERIALS
100 Barr Harbor Dr., West Conshohocken, PA 19428
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Standard Guide for Maintaining Unqualified Coatings (Paints) Within Level I Areas of a Nuclear Power Facility[1]

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1. Scope

1.1 This guide is intended to assist the maintenance engineer in the preparation of a specification or work instruction for re-coating items that are presently coated with what is known within the nuclear power industry as an "unqualified coating."

2. Referenced Documents

2.1 *ASTM Standards:*

D 610 Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces[2]

D 714 Test Method for Evaluating Degree of Blistering of Paints[3]

D 772 Test Method for Evaluating Degree of Flaking (Scaling) of Exterior Paints[3]

D 1186 Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Metal Base[3]

D 3359 Test Methods for Measuring Adhesion by Tape Test[3]

D 4227 Practice for Qualification of Coating Applicators for Application of Coatings to Concrete Surfaces[2]

D 4228 Practice for Qualification of Coating Applicators for Application of Coatings to Steel Surfaces[2]

D 4537 Guide for Establishing Procedures to Qualify and Certify Inspection Personnel for Coating Work in Nuclear Facilities[2]

D 4541 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers[2]

2.2 *Other Standards:*

SSPC-SP 1 Solvent Cleaning Issued by Steel Structure Painting Council[4]

SSPC-SP 3 Power Tool Cleaning Issued by Steel Structures Painting Council[4]

SSPC-SP 11 Power Tool Cleaning to Bare Metal as Issued by Steel Structures Painting Council[4]

3. Terminology

3.1 *Definitions:*

3.1.1 *unqualified coating or paint*—a coating or coating system that cannot be attested to having passed the required laboratory testing, including irradiation and simulated Design Basis Accident (DBA) or lacks adequate quality documentation to support its use as qualified.

3.1.2 *design basis accident (DBA)*—a generic term for any one of a family of accident conditions that can result from postulated events.

3.1.2.1 *Discussion*—These conditions are generally associated with the rupture of high energy piping. The most commonly recognized accident conditions used to evaluate coating systems for primary containment, are the LOCA or Main Steam Pipe Break.

3.1.3 *LOCA*—loss of coolant accident.

3.1.4 *SAR*—(Safety Analysis Report) the document of a nuclear power plant that maintains licensability.

4. Summary of Guide

4.1 This guide is summarized in Table 1, which shows the steps in the recoating sequence necessary for adequate protection of an unqualified coated item.

4.2 In order to use this guide, conditions such as temperature, relative humidity, etc. under which the new coating must perform during normal operating conditions must be known and considered.

5. Significance and Use

5.1 There are different methods for maintaining unqualified coatings in an operating nuclear power plant. This guide outlines a method that has been found to be acceptable to the industry and, when followed, will not affect the safety of the nuclear plant.

5.2 There are several prerequisites prior to any coating work in coating service Level 1 areas (Quality Class 1). They are as follows:

5.2.1 Coating applicator shall be qualified in accordance with Practices D 4227 and D 4228, or the qualification requirements of the utility.

5.2.2 The amount of unqualified coating shall have been inventoried and identified prior to the re-coat work activity.

5.2.3 The practice of maintaining unqualified coating with a better or equal grade of unqualified coating is acceptable to the

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[2] *Annual Book of ASTM Standards*, Vol 06.02.

[3] *Annual Book of ASTM Standards*, Vol 06.01.

[4] Available from Steel Structure Painting Council, 4516 Henry Street, Suite 301, Pittsburgh, PA 15213-3728.

TABLE 1 Suggested Steps in the Development of a Maintenance Program for Re-Coating Over Unqualified Coatings

Steps in the Program	References, ASTM or SSPC Standards
1. Assess condition of the existing coating or paint.	Visual or: D 610 D 714 D 772 D 1186 D 3359 D 4541
2. Identify existing coating system used on the item(s), if possible.	Purchase specification or original work document.
3. Investigate coating system(s) available in the marketplace that will withstand the environment of the item being recoated.	Various sources including vendors and Section 7 of this guide.
4. Determine the best achievable surface preparation for the item to be recoated. The method would be dependent upon the location, the amount of radiological dose in the area, ALARA concerns and manufacturer's instructions.	SSPC-SP 3 or SSPC-SP 11 or SSPC-SP 1
5. Develop the work instructions (or specification) which would include: coating to be used, wet and dry film thickness, color; number of coats, and cure times. Note: The color selected shall be different than that of the qualified coating materials.	
6. Inspect the work.	Inspection Plan

utility and in agreement with the utilities' SAR.

5.2.4 The amount of square footage or weight, or both, of unqualified coating committed to in the utilities' SAR, shall not be exceeded.

NOTE 1—Existing components in coating service Level 1 areas may have been originally installed having unqualified coatings. Should the need arise to replace these items, every effort shall be made to utilize qualified coating systems applied within the vendor's shop or prior to placement within the plant.

5.2.5 Inspector shall be qualified in accordance with Practice D 4537 or the inspection plan of the utility.

6. Precautions for Re-Coating Over an Unqualified Coating

6.1 If it is decided to use a coating over an unqualified coating, the following must be understood:

6.1.1 The use of a qualified coating over an unqualified coating does not make the system "qualified".

6.1.2 The surface preparation time may be more for the qualified coating, thus more radiological dose is received by the worker.

6.1.3 The color of the re-coating material shall be different from the existing qualified coatings installed.

7. Selecting the Coating to be Used

7.1 Prior to final selection of a coating material for use over an unqualified coating material, several application screening tests are suggested to be performed in a Non-Level 1 test area.

7.1.1 Determine wet film build of the material by the same method of application intended (that is, brush, spray, roller or mitt).

7.1.2 Establish the required amount and type of thinner, if needed, to make the material workable.

7.1.3 Duplicate application conditions in the area in which the coatings shall be applied (for example; moist surface conditions within the dry well).

7.1.4 Evaluate the adhesion characteristics of the product over the existing (or similar) "unqualified paint" in accordance with Test Method D 4541.

7.1.5 Evaluate the odor characteristics and solvent composition of the candidate material.

7.1.6 Determine the needed wet film thickness to achieve the required dry film of the candidate material.

7.1.7 Evaluate the candidate material's suitability for the anticipated use and prepare the specification or work instruction based upon the data obtained.

8. Keywords

8.1 as low as reasonably achievable (ALARA); DBA; design basis accident; LOCA; unqualified coatings