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Standard Practice for Quality Assurance for Protective Coatings Applied to Nuclear Facilities[1]

This standard is issued under the fixed designation D 3843; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice provides a common basis for, and specifically comprises quality assurance requirements applicable to, safety-related protective coating work in Coating Service Level I areas of nuclear ~~facilities.~~

~~1.2Applicable portions of this practice may be used~~ facilities as ~~the basis for limited quality assurance for protective coating work~~ defined in ~~Coating Service Level II areas of nuclear facilities.~~ Guide D 5144.

~~1.3~~1.2 *This standard does not purport to address all of the safety ~~problems,~~concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

~~D3842Guide for Selection of Test Methods for Coatings for Use in Light-Water Nuclear Power Plants~~ 4227 Practice for Qualification of Coating Applicators for Application of Coatings to Concrete Surfaces

~~D4227Practice for Qualification of Coating Applicators for Application of Coatings to Concrete Surfaces of Safety-Related Areas in Nuclear Facilities[2]~~ 4228 Practice for Qualification of Coating Applicators for Application of Coatings to Steel Surfaces

~~D4228Practice for Qualification of Coating Applicators for Application of Coatings to Steel Surfaces of SafetyRelated Areas in Nuclear Facilities[2]~~ 4537 Guide for Establishing Procedures to Qualify and Certify Personnel Performing Coating Work Inspection in Nuclear Facilities

~~D4537Guide for Establishing Procedures to Qualify and Certify Inspection Personnel for Coating Work in Nuclear Facilities[2]~~ 5144 Guide for Use of Protective Coating Standards in Nuclear Power Plants

2.2 *ANSI Standards:* [3]

~~N45.2Quality Assurance Program Requirements for Nuclear Power Plants~~

~~NQA-1(86) Quality Assurance Program Requirements for Nuclear Facilities[3]~~ Quality Assurance Program Requirements for Nuclear Power Plants

2.3 *ASME Standard:* [4]

NQA-1 (89) Quality Assurance Program Requirements for Nuclear Facilities

2.4 *Code of Federal Regulations:* [5]

10 CFR 50 , Appendix B: Title 10, Chapter 1, Energy, Part 50, Domestic Licensing of Production and Utilization Facilities, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants

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~~[1] This practice is under the jurisdiction of ASTM Committee D-33 on Protective Coating and Lining Work for Power Generation Facilities and is the direct responsibility of D33.03 on Quality Systems.~~

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[1] This practice is under the jurisdiction of ASTM Committee D33 on Protective Coating and Lining Work for Power Generation Facilities and is the direct responsibility of D33.04 on Quality Systems and Inspection.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* ~~, Vol 06.02.~~volume information, refer to the standard's Document Summary page on the ASTM website.

~~[3] Available from American National Standards Institute, 13th Floor, 11 W. 42nd St., New York, NY 10036.~~

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

~~[4] Available from the American Society of Mechanical Engineers, 345 E. 47th St., NY 10017.~~

[4] Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Three Park Ave., New York, NY 10016-5990, http://www.asme.org.

~~[5] Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.~~

[5] Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, http://www.access.gpo.gov.

~~10CFR 50, Appendix B: Title 10, Chapter 1, Energy, Part 50, Domestic Licensing of Production and Utilization Facilities, Appendix B, Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants~~ 10 CFR 21 Reporting of Defects and Noncompliances

2.5 *Other Documents:*

~~10CFR 21 Reporting of Defects and Noncompliances~~ EPRI TR-109937 Guideline on Nuclear Safety-Related Coatings[6]

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 ~~*certification*~~certification, *n*—the written documentation of the qualification of personnel or material.

3.1.2 ~~*coating applicator*~~coating applicator, *n*—an organization or individual responsible for applying a protective or decorative coating system.

3.1.3 ~~*coating (paint)*—a liquid, liquifiable, or mastic composition that is converted to a solid protective or functional adherent film after application as a thin layer.~~

3.1.4~~*coating manufacturer*~~coating manufacturer, *n*—an organization responsible for manufacturing coating materials.

3.1.5~~*coating system*~~

3.1.4 *coating system*, *n*—a polymeric protective film consisting of one or more coats, applied in a predetermined order by prescribed methods.

3.1.5 *coating work*, *n*—an all-inclusive term to define all operations required to accomplish a complete coating job. The term shall be construed to include materials, equipment, labor, preparation of surfaces, control of ambient conditions, application and repair of coating systems, and inspection.

3.1.6 ~~*coating work*—an all-inclusive term to define all operations required to accomplish a complete coating job. The term shall be construed to include materials, equipment, labor, preparation of surfaces, control of ambient conditions, application and repair of coating systems, and inspection.~~

3.1.7~~*Code of Federal Regulations (CFR)*~~Code of Federal Regulations (CFR), *n*—the rules and regulations of the United States Federal Government. The code is subdivided into titles, with Title 10 (10 CFR) applying to energy.

3.1.7 *paintings/coatings/linings*, *n*—essentially synonymous terms for liquid-applied materials consisting of pigments and fillers bound in a resin matrix, which dry or cure to form a thin, continuous protective or decorative film. "Linings" indicate an immersion environment.

3.1.8 ~~*deviation*~~deviation, *n*—a departure of a characteristic from established procedures or from specified requirements.

3.1.9 ~~*documentation*~~documentation, *n*—any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

3.1.10 ~~*inspection*~~inspection, *n*—a phase of quality control which by means of examination, observation, or measurement determines the conformance of materials, supplies, components, parts, appurtenances, systems, processes, or structures to predetermined quality requirements.

3.1.11 *inspection agency*, *n*—a person or persons authorized by the owner or owner's designee to verify and attest conformance of the coating work.

3.1.12 ~~*nonconformance*~~nonconformance, *n*—a deficiency in characteristic, documentation, or procedure that renders the quality of an item unacceptable or indeterminate. Examples of nonconformances include: physical defects, test failures, incorrect or inadequate documentation, or deviation from prescribed processing, inspection, or test procedures.

3.1.13 ~~*owner*~~owner, *n*—the person, group, company, or corporation who has or will have the license for the facility or installation.

3.1.14 ~~*owner's designee*~~owner's designee, *n*—a person or persons authorized by the owner to act in his behalf.

3.1.15 ~~*vendor*~~vendor, *n*—any individual or organization who furnishes items or service to a procurement document.

4. Significance and Use

~~4.1Quality assurance, as covered by this practice, comprises all those planned and systematic actions necessary to provide adequate confidence that safety-related coating work in nuclear facilities will perform satisfactorily in service.~~

~~4.2Coating Service Level I applies to areas where coatings failure could adversely affect the operation of post-accident fluid systems. With some exceptions, Coating Service Level I applies to coatings inside primary containment.~~

~~4.3Coating Service Level II applies to areas where coatings failure could impair, but not prevent, normal operating performance. The primary function of Service Level II coatings is to provide corrosion protection and decontaminability in those areas outside primary containment subject to radiation exposure and radionuclide contamination.~~

~~4.4It is not practical to impose all the requirements of this practice on certain specific items that require only a small quantity of coating material. The owner, consistent with his formal Quality Assurance Program, may accept affidavits of compliance or certification attesting to the quality of a shop or field coating for such items. If required by licensing commitments, uncontrolled (unqualified, nonconforming, or unidentified) coatings shall be identified, quantified, and documented.~~

[6] Available from EPRI, 3420 Hillview Ave., Palo Alto, CA 94304, askepri@epri.com, http://www.epri.com.

~~4.5This practice may be incorporated in a project specification by direct reference or may be used to provide guidelines for the quality assurance program for coatings, on the basis of the owner's requirements. Effective use of this practice may also require the incorporation of applicable sections in project specifications for coatings on concrete, steel, equipment, and other related items.~~

4.1 Quality assurance, as covered by this practice, comprises all those planned and systematic actions necessary to provide adequate confidence that safety-related coating work in nuclear facilities as defined in Guide D 5144, will perform satisfactorily in service.

4.2 It is not practical to impose all the requirements of this practice on certain specific items that require only a small quantity of coating material. The owner, consistent with his formal Quality Assurance Program, may accept affidavits of compliance or certification attesting to the quality of a shop or field coating for such items. If required by licensing commitment; safety-related coatings that are not qualified or for which the quantification basis is indeterminate as defined in Guide D 5144, shall be identified, quantified, and documented.

4.3 This practice may be incorporated in a project specification by direct reference or may be used to provide guidelines for the quality assurance program for coatings, on the basis of the owner's requirements. Effective use of this practice may also require the incorporation of applicable sections in project specifications for coatings on concrete, steel, equipment, and other related items.

5. General Quality Assurance Requirements

5.1 This section defines the general quality assurance requirements necessary for compliance with this practice. These requirements shall apply to all other sections of this practice.

5.2 The owner or the owner's designee shall be responsible for determining whether source inspection or a certificate of compliance attesting to the quality of coating work activity is required.

5.3 The general quality assurance requirements necessary to meet the purpose of this practice provide an acceptable basis for establishing a protective coating quality assurance program. All deviations from or exceptions to these requirements shall be reviewed by and shall be subject to approval by the owner or his designee before implementation. If unapproved deviations are discovered during any phase of the coating work activity, a nonconformance report shall be completed either by the owner, vendor, or owner's designee. The owner or the owner's designee shall approve the disposition of the nonconformance report in accordance with the owner's quality assurance program.

NOTE 1—Notification of the Nuclear Regulatory Commission (NRC) is required by 10 CFR 21for certain types of defects and noncompliances.

~~5.4There are five major activities that shall be controlled and documented as a minimum for Service Level I protective coatings applied to nuclear facilities as follows:~~

~~5.4.1Qualification and selection of coating materials,~~

~~5.4.2Coating manufacturing,~~

~~5.4.3Surface preparation of substrates,~~

~~5.4.4Control of coating application, and~~

~~5.4.5Coating inspection.~~

~~5.5The five major activities specified in 5.4 are designed to meet the applicable quality assurance requirements of Appendix B to 10 CFR 50, ANSI N45.2, and also the intent of ASME NQA-1. All five of these controlled activities shall have appropriate documentation including approved procedures and records to meet the applicable requirements.~~

~~5.6The qualification and selection of coating materials shall be evaluated by the owner on the basis of criteria defined in Section 6 of this practice.~~

~~5.7The coating manufacturer shall furnish a quality assurance program describing his methods for quality control of the specified coatings on the basis of criteria defined in Section 7, which is approved by the owner.~~

~~5.8Should the owner designate an outside coating applicator to apply the specified coatings, the coating applicator shall provide a quality assurance program based on the criteria defined in Sections 8 and 9, which is approved by the owner.~~

~~5.9Should the owner designate an inspection agency to inspect the application of the specified coatings, the inspection agency shall provide a quality assurance program based on the criteria defined in Section 10, which is approved by the owner.~~

~~5.10If application or inspection, or both, are performed under the owner's quality assurance program, procedures shall be established to control these activities.~~

5.4 Safety-related coating work shall be governed by programmatic and procedural quality provisions that ensure that the requirements of 10 CFR 50, Appendix B as defined are satisfied. Guidance in this regard is available in ANSI N45.2 and ASME NQA-1. Refer, also, to EPRI TR-109937.

6. Control of Selection and Qualification of Coating Materials

6.1 All qualifications of coating materials shall meet the applicable standards referenced in Guide ~~D3842~~D 5144to the extent defined by the owner or the owner's designee in design criteria, safety analysis reports, quality assurance program, or other controlling documents.

6.2 The coating manufacturer shall furnish recommended surface preparation and application procedures for each coating system on each substrate as covered by the project specification including previously coated surfaces as applicable. The coating manufacturer shall also furnish recommended storage conditions for each coating material specified.