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Standard Guide for Establishing a Program for Condition Assessment of Coating Service Level I Coating Systems in Nuclear Power Plants¹

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1. Scope

1.1 This standard covers procedures for establishing a monitoring program for condition assessment of Coating Service Level I coating systems in operating nuclear power plants. Monitoring is an ongoing process of evaluating the condition and performance of the in-service coating systems.

1.2 It is the intent of this standard to provide a recommended basis for establishing a coatings condition assessment program, not to mandate a singular basis for all programs. Variations or simplifications of the program described in this standard may be appropriate for each operating nuclear power plant depending on their licensing commitments. Similar guidelines are applicable for Coating Service Level III and other areas outside containment.

1.3 This standard does not address the requirements of ASME Section XI, In-Service Inspection Subsections IWE and IWL.

1.4 *This standard does not purport to address all of the safety 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

- D610 Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
- D714 Test Method for Evaluating Degree of Blistering of Paints
- D1186 Test Methods for Nondestructive Measurement of

Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base (Withdrawn 2006)³

D3359 Test Methods for Measuring Adhesion by Tape Test
D4538 Terminology Relating to Protective Coating and Lining Work for Power Generation Facilities

D4541 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers

D5498 Guide for Developing a Training Program for Personnel Performing Coating and Lining Work Inspection for Nuclear Facilities

D6677 Test Method for Evaluating Adhesion by Knife

D7108 Guide for Establishing Qualifications for a Nuclear Coatings Specialist

2.2 *SSPC Standards:*⁴

SSPC-PA 2 Measurement of Dry Paint Thickness With Magnetic Gages

SSPC-VIS 2 Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces

3. Terminology

3.1 *Definitions*—Definitions for use with this standard are shown in Terminology D4538 or other applicable standards.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *coating maintenance work, n*—all-inclusive term associated with coating work that expressly relates to repair, refurbishment, or replacement of an existing coating. (See also *coating work*.)

3.2.2 *in-service coatings monitoring program, n*—systematic program established to assess and document the condition of an existing coating system with respect to prescribed performance attributes.

4. Significance and Use

4.1 Establishment of an in-service coatings monitoring program permits planning and prioritization of coatings maintenance work as needed to maintain coating integrity and

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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* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656, <http://www.sspc.org>.

performance in nuclear Coating Service Level I coating systems. For additional information on nuclear maintenance coating work, refer to ASTM Manual on Maintenance Coatings for Nuclear Power Plants.⁵

4.2 A coatings monitoring program enables early identification and detection of potential problems in coating systems. Some Coating Service Level I coating systems may be known in advance to be suspect, deficient, or unqualified. Monitoring coating performance will assist in developing follow-up procedures to resolve any significant deficiency relative to coating work.

4.3 Degraded coatings may generate debris under design basis accident conditions that could adversely affect the performance of the post-accident safety systems. A coatings monitoring program may be required to fulfill safety analysis report and generic letter commitments for Coating Service Level I coating work in a nuclear power plant facility.

5. Responsibility

5.1 The licensee or his designee shall identify the department or group within the organization to be responsible for establishing the applicable requirements for activities or procedures covered by this guide and shall document the scope of their responsibility. Delegation of this responsibility to other outside qualified organizations is permitted and shall be documented.

5.2 It is the responsibility of the licensee or his designee performing these activities to specify the detailed methods and procedures for meeting the applicable requirements of this guide.

5.3 The licensee or his designee shall assign a coordinator to be responsible for supervising coating inspection activities, data collection and documentation, and for ensuring that inspection personnel are adequately trained and qualified.

5.4 The licensee or his designee shall assign responsibility for evaluating the results of inspection activities carried out under the in-service coatings monitoring program.

5.5 In the event of conflict, users of this guide must recognize that the licensee's plant-specific quality assurance program and licensing commitments shall prevail with respect to the coating performance monitoring process.

6. Frequency

6.1 Frequency of in-service coating inspection monitoring shall be determined by the licensee or his designee. In operating nuclear power plants certain monitoring activities may be restricted to major maintenance outages or refueling outages. It is a good practice to perform inspections during each refueling outage or during other major maintenance outages.

7. Records and Past History

7.1 Coating performance will depend on the operating conditions experienced by the coating systems. Records of

these conditions shall be obtained for each operating unit. These may include, but not be limited to, ambient conditions, temperatures, humidity, immersion, splash and spillage, chemical exposures, radiation exposures, previous decontamination procedures, abrasion and physical abuse, and start-up/shutdown frequency. Any change in service criteria or modifications of the physical design shall be identified and dated.

7.2 The last two performance monitoring reports pertaining to the coating systems shall be reviewed prior to the monitoring process. Other past coatings history data to be reviewed may include:

7.2.1 Copies of coating specifications, manufacturer's product data sheets, and application procedures for in-place coatings.

7.2.2 Quality control documentation for the existing in-place coating systems and their application.

7.2.3 Copies of previous inspection or monitoring reports.

7.2.4 Documentation pertaining to any maintenance work performed on existing coating systems.

8. Monitoring Procedure

8.1 Prior to conducting an inspection of the coating systems, the responsible organization shall ensure that the necessary services and equipment required for inspection are provided. Factors that must be considered while planning the inspection activities include, but are not limited to, lighting, access to coated surfaces, cleaning surfaces of any deposit or build up, ventilation and, where necessary, special underwater inspection requirements.

8.2 Station access procedures for Coating Service Level I coating systems monitoring shall be followed. While access procedures may vary from plant to plant, specific station access procedures may include:

8.2.1 Security clearance for protected, radiation controlled, and vital areas, and escorted or unescorted clearance as required,

8.2.2 Radiological history including prior radiation exposure for all personnel involved,

8.2.3 Health physics classroom training in the use of radiation detection and monitoring devices and procedures for wearing anti-contamination clothing,

8.2.4 A radiation work permit based on health physics' radiological survey of the work location,

8.2.5 Compliance with radiation work permit requirements and other special radiation controls unique to each work location, and

8.2.6 Issuance of dosimetry.

8.3 The safety requirements of the facility licensee or his designee must be met when performing all inspection operations.

9. Personnel Requirements, Qualifications, and Training

9.1 Individuals who perform visual assessment and coordinate coating condition assessment shall be the Nuclear Coating Specialist (Guide D7108) or personnel judged to be acceptable by the Nuclear Coating Specialist. After visual assessment, should the Nuclear Coating Specialist determine that a specific follow-up inspection is needed, individuals performing that

⁵ MNL8, Available from ASTM International Headquarters, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.