

# PUBLIC SUBMISSION

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Service Level I, II, III and In-Scope License Renewal Protective Coatings Applied to Nuclear Power Plants

**Comment On:** NRC-2016-0192-0001

Service Level I, II, III, and In-Scope License Renewal Protective Coatings Applied to Nuclear Power Plants;  
 Request for Comment on Draft Regulatory Guide

**Document:** NRC-2016-0192-DRAFT-0003

Comment on FR Doc # 2016-21956

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## Submitter Information

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9/13/2016  
 81FR 62935

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RULES AND DIRECTIVES

## General Comment

November 14, 2016

Ms. Cindy K. Bladey  
 Office of Administration  
 Mail Stop: OWFN-12-H08  
 U.S. Nuclear Regulatory Commission  
 Washington, DC 20555-0001

Subject: Industry Comments on Draft Regulatory Guide DG-1331, "Service Level I, II and III and In-Scope License Renewal Protective Coatings Applied to Nuclear Power Plants," Federal Register Notice 81 FR 62935, Docket ID NRC-2016-0192

Project Number: 689

Dear Ms. Bladey:

SUNSI Review Complete

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On behalf of the industry, the Nuclear Energy Institute (NEI) is pleased to provide comments in response to FRN 62935, where the U.S. Nuclear Regulatory Commission (NRC) requested public comment on the Draft Regulatory Guide DG-1331 "Service Level I, II and III and In-Scope License Renewal Protective Coatings Applied to Nuclear Power Plants" (Regulatory Guide 1.54). This regulatory guide (RG) describes a method the staff of the NRC considers acceptable for the selection, application, qualification, inspection and maintenance of protective coatings applied to nuclear power plants. Information contained within the subject RG as well as comments received will be used to inform changes being made to and incorporated into the final versions of RG 1.54. The purpose of this letter is to provide integrated industry comments on the subject draft document. Detailed industry comments are presented in the attachment.

We appreciate the opportunity to comment on the draft document and request that you incorporate industry comments as recommended in the attachment. If you have any questions or require additional information, please contact me.

Sincerely,

Jerud E. Hanson  
Senior Project Manager, Plant Life Extension

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## Attachments

11-14-16\_NRC\_Industry Comments on Draft Regulatory Guide DG-1331

11-14-16\_NRC\_Industry Comments on Draft Regulatory Guide DG-1331\_Attachment

**JERUD E. HANSON**

Senior Project Manager, Plant Life Extension

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**Project Number: 689**

Dear Ms. Bladey:

On behalf of the industry, the Nuclear Energy Institute (NEI)<sup>1</sup> is pleased to provide comments in response to FRN 62935, where the U.S. Nuclear Regulatory Commission (NRC) requested public comment on the Draft Regulatory Guide DG-1331 "Service Level I, II and III and In-Scope License Renewal Protective Coatings Applied to Nuclear Power Plants" (Regulatory Guide 1.54). This regulatory guide (RG) describes a method the staff of the NRC considers acceptable for the selection, application, qualification, inspection and maintenance of protective coatings applied to nuclear power plants. Information contained within the subject RG as well as comments received will be used to inform changes being made to and incorporated into the final versions of RG 1.54. The purpose of this letter is to provide integrated industry comments on the subject draft document. Detailed industry comments are presented in the attachment.


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<sup>1</sup> The Nuclear Energy Institute (NEI) is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations and entities involved in the nuclear energy industry.

Ms. Cindy K. Bladey  
November 14, 2016  
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We appreciate the opportunity to comment on the draft document and request that you incorporate industry comments as recommended in the attachment. If you have any questions or require additional information, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Jerud E. Hanson", with a long horizontal flourish extending to the right.

Jerud E. Hanson

Attachment

c: Ms. Jane E. Marshall, NRR/DLR, NRC  
Mr. Steven D. Bloom, NRR/DLR/RSRG, NRC  
Mr. Matthew G. Yoder, NRR/DE/ESGB, NRC

**CONSOLIDATED INDUSTRY COMMENTS ON DRAFT-RG-1.54**  
**SERVICE LEVEL I, II, III AND IN-SCOPE LICENSE RENEWAL PROTECTIVE COATINGS**  
**APPLIED TO NUCLEAR POWER PLANTS**

Comment Number	Section / Pg.#	Comment	Notes/Recommendations
1	Page 4, paragraph 2, line 2	Nuclear power plants use protective coatings to protect the surfaces of facilities and equipment against corrosion and contamination from radionuclides <del>and for wear protection during plant operation and maintenance activities.</del>	Not part of plant's CLB.
2	Page 4, paragraph 2, line 5	For plants with a design basis that includes a commitment to a previous revision of RG 1.54, the regulations cited above require that protective coatings be qualified and capable of surviving a design-basis <i>accident</i> event ( <del>DBA DBE</del> ) without impairing the safety-related SSCs needed to mitigate the event.	Change "design basis event" to "design basis accident" to better align with standard industry terminology.
3	Page 5, paragraph 1, line 3	ASTM D 5144-08 <del>1</del> addresses, <del>by reference,</del> the preparation of test specimens, radiation tolerance testing, <del>ability to be decontaminated,</del> physical properties, chemical resistance tests, fire evaluation tests, Design Basis Accident (DBA) testing, surface preparation, coating application and inspection, and thermal conductivity testing.	Delete "by reference", as it is not required. Delete "ability to be decontaminated", as ASTM D5144 no longer addresses or references decontamination aspects.
4	Page 5, Definitions, Service Level II		This definition of SLII coatings is not accurate. The definition should be revised based on the definition contained in ASTM D4538-15.
5	Page 5, Definitions, Service Level II	The functions of Service Level II coatings are to provide corrosion protection and enhance the <i>substrate's coating's</i> ability to be decontaminated in those areas outside the reactor containment that are subject to radiation exposure and radionuclide contamination.	Coatings are provided to enhance the ability to decontaminate the substrate, not decontaminate itself (the coating).

## Attachment

Comment Number	Section / Pg.#	Comment	Notes/Recommendations
6	Page 5, Last paragraph, last sentence	The first example is not covered by the Service Level I <i>and III</i> definitions because degradation of these coatings would not adversely affect the operation of post-accident fluid systems.	The first example is not covered by either SL1 nor SLIII definitions.
7	Page 7, Figure 1	D5144-16 (recently reapproved/revised) D4538-15 D4227-05 (Reapproved 2012) D4228-05 (Reapproved 2012) D4286-08 (Reapproved 2015) D6677-07 (Reapproved 2012) D7491-08 (Reapproved 2015) <u>DELETE</u> D3359 <u>ADD to first column of flowchart</u> D7230-06 (Reapproved 2013)	Regulatory Guide should reflect current editions of standards, the addition of newly developed standards, and deletion of standards that are no longer a part of ASTM.  Delete D3359, as the tape referenced by the standard is no longer manufactured and renders the standard unusable.  The other standard ASTM D7230 is part of ASTM D5144 now and should be added.
8	Page 7, Figure 1	The following three standards have been ballot approved and are with ASTM Publishing. These are key standards that underwent significant changes. Therefore, it is recommended that finalization of RG 1.54 R3 be delayed until after these standards become available and are reviewed by the NRC for inclusion in RG 1.54 R3. Publication of these standards is expected prior to 12/31/16. The applicable standards are as follows: D3843-00 (2008), D3911-08, D5163-08	N/A
9	Page 7, Figure 1	See recommendation.	Delete ASTM D3359-09e2. The tape referenced in this standard is no longer available and renders the standard unusable.

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Comment Number	Section / Pg.#	Comment	Notes/Recommendations
10	Page 7, Figure 1	See recommendation.	Add ASTM D7230 under QA practices.
11	Page 8, Section 2.1, Line 3	ASTM D 3843- <del>1600</del> , "Standard Practice for Quality Assurance for Protective Coatings Applied to Nuclear Facilities" (Ref. 16). The ASTM International approved and issued ASTM International Standard D 3843- <del>1600</del> as a <del>partial</del> <b>complete</b> replacement for ANSI N101.4-1972. ASTM D 3843- <del>1600</del> provides QA practices that are acceptable to NRC staff and are applicable to safety related protective coating work in coating Service Level I areas of nuclear facilities. Service Level II coatings as defined above are not safety related, but they are <b>approved</b> <del>qualified by testing</del> for their particular application <del>by the manufacturer</del> . Licensees and applicants may use applicable portions of the QA practices described in ASTM D 3843- <del>1600</del> as the basis for limited QA for protective coating work in coating Service Level II areas of nuclear facilities.	<p>The forthcoming ASTM committee revision of D3843 (-16) was made to eliminate the "partial" replacement qualifier that the RG has applied in the past and is now a complete replacement to ANSI N101.4 and should be reflected here.</p> <p>In addition, Service Level II coatings are not required to be tested for their applications as they are non-safety related coatings. The coatings are evaluated by Engineering to be suitable for their intended application.</p>
12	Page 11, Section 4.1.d, Line 3	Although the ASTM D 5163-08 standard reasonably ensures that qualified coatings left in service after a visual inspection will remain adhered to their substrates under accident conditions, it <del>may</del> <b>does</b> not guarantee that visual inspection will detect all degraded coatings.	Studies/OE have not to date determined that visual inspections will not detect degraded coatings when performed. By changing this to "may", it leaves room for the possibility.
13	Page 11, Section 4.3	<del>ASTM D 3359-09e2, "Standard Test Methods for Measuring Adhesion, by Tape Test," (Ref. 31) offers guidance that the NRC staff finds acceptable for assessing the adhesion of coating films to metallic substrates by using pressure sensitive tape."</del>	Delete entire section. Tape referenced in standard is no longer available such that this standard is no longer usable.

**Attachment**

<b>Comment Number</b>	<b>Section / Pg.#</b>	<b>Comment</b>	<b>Notes/Recommendations</b>
14	Page 17, Reference 31	Delete reference to D3359. Tape referenced in standard is no longer available such that this standard is no longer usable. Comments above would eliminate the need for reference here.	N/A
15	Entire Document	Reference to current standards will result in additional changes throughout the document including references. The new standards would also potentially result in revisions to NRC guidance contained in Part C of this Regulatory Guide.	N/A
16	Entire Document	The intent of the following comment is to address the generic observation that this draft RG appears to represent a shift in the reliance upon destructive examination techniques and methods, with respect to coating evaluations, as opposed to reliance and acceptance of visual inspections. It is requested that the following comment be generically considered, as it summarizes what was done in order to previously obtain USNRC formal written agreement that visual precursors can be acceptably used to predict coating degradation.	N/A

## Attachment

Comment Number	Section / Pg.#	Comment	Notes/Recommendations
17	Entire Document	<p>In 2006, Licensees typically followed ASTM D5163-05a, "Standard Guide for Establishing Procedures to Monitor the Performance of Coating Service Level I Coatings in an Operating Nuclear Power Plant", as a guideline to conduct containment coatings condition assessment activities. ASTM D5163 had been endorsed by the U.S. Nuclear Regulatory Commission (USNRC) in Regulatory Guide (RG) 1.54 Revs.1 and 2 and NUREG 1801 (the GALL Report). ASTM D5163 is predicated around the fact that DBA-qualified reactor containment coatings will exhibit "visual precursors" prior to failure. These visual precursors can be identified by trained condition assessment personnel.</p> <p>To validate the visual precursor prior to failure concept, Electric Power Research Institute (EPRI), the Nuclear Utilities Coating Council (NUCC), and ASTM Committee D33 needed to select a measurable physical property of DBA-qualified coatings which could be measured on visually-intact reactor containment protective coatings at commercial nuclear power plants. The coating property selected was pull-off adhesion testing</p> <p>EPRI and NUCC conducted a project entitled, "Evaluation of Coating Failures and the Potential Influence of Aging." Task 3 of the project involved adhesion testing of visually intact, Design Basis Accident (DBA) qualified coatings on concrete and steel. Per ANSI N5.12-1974, Section 6.4, which requires "that containment coatings exhibit 200 lbs minimum adhesion when measured using an Elcometer adhesion tester".</p>	

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18	Entire Document	<p>The pull-off adhesion testing was performed at four operating commercial nuclear power plants, each with different protective coating systems on the reactor containment SSC's.</p> <p>The procedure performed at each unit was as follows:</p> <ol style="list-style-type: none"> <li>1. Perform a documentation review at each volunteer plant to identify areas of DBA-qualified/acceptable coatings on steel and concrete substrates.</li> <li>2. Perform a general visual inspection of selected areas of DBA-qualified/acceptable coatings on steel and concrete substrates according to ASTM D5163-05a. Coated test areas include visually sound coatings and visually sound coatings adjacent to visually degraded coatings.</li> <li>3. Document each selected test area (including photography).</li> <li>4. At each test area, perform all of the following:               <ol style="list-style-type: none"> <li>a. Dry film thickness testing as stated in SSPC-PA 2, ASTM D4138-94 (re-approved 2000), and/or ASTM D6132-04 as appropriate</li> <li>b. Adhesion testing according to ASTM D4541-02</li> <li>c. Adhesion testing according to ASTM D6677-01</li> </ol> </li> </ol>	

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19	General Comment	<p>The results of the test program were provided to industry and USNRC in EPRI Report 1014883. After completion of testing at all four volunteer plants, the following conclusions were reached by USNRC and documented in "NRC Staff Review Guidance Regarding Generic Letter 2004-02 Closure in the Area of Coatings Evaluation" (ML080230462 : "In a letter to the Nuclear Energy Institute dated January 16, 2006 (ADAMS Accession Number ML053470467), the NRC staff expressed concerns regarding the adequacy of the current industry method for assessment of qualified coatings within containment. The staff specifically questioned the adequacy of visual assessment to verify the condition of qualified coatings. In response to the staff concerns, EPRI sponsored a project (see EPRI Report No. 1014883 July 2007) to collect coating adhesion data for coating systems applied in the containments of operating U.S. nuclear power plants to provide confirmatory support for coating inspection methods that rely upon visual inspection as an initial step. The staff has reviewed this report and determined that it provides adequate supporting evidence that the containment coatings monitoring approach contained in ASTM D5163, as implemented by licensees, and endorsed by USNRC in Regulatory Guide 1.54, Rev.1, and NUREG 1801, Vol. 2, Appendix XI.S8, is valid.</p> <p>Licensees may reference the EPRI coatings adhesion testing program as confirmation of the validity of their coatings assessment program. In addition, licensees may choose to provide a discussion of other activities in which they have participated in to support their coatings program. Such activities may include the EPRI Coatings Aging Task Group, the EPRI survey of coating failure operating experience, physical testing performed by the licensee, and plant operating experience with coating performance."</p>	

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<b>Comment Number</b>	<b>Section / Pg.#</b>	<b>Comment</b>	<b>Notes/Recommendations</b>
20	General Comment	The formal approval by USNRC of the use of visual assessment of coatings, as defined in ASTM D5163, is clearly defined. Suggesting now in the draft revision to RG 1.54 Rev. 3 that Licensees include undefined extra coatings debris margin for undefined conservatism is technically unsupported at such time.	