

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
ENTERGY NUCLEAR OPERATIONS, INC.	)	Docket No. 50-255-LA2
	)	
(Palisades Nuclear Plant)	)	

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NRC STAFF'S ANSWER TO PETITION TO INTERVENE AND HEARING REQUEST FILED BY  
BEYOND NUCLEAR, DON'T WASTE MICHIGAN, MICHIGAN SAFE ENERGY FUTURE-  
SHORELINE CHAPTER, AND THE NUCLEAR ENERGY INFORMATION SERVICE

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April 3, 2015

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INTRODUCTION

On March 9, 2015, Petitioners Beyond Nuclear, Don't Waste Michigan, Michigan Safe Energy Future – Shoreline Chapter, and the Nuclear Energy Information Service ("Petitioners") filed a petition to intervene and a request for hearing ("Petition") concerning a license amendment request ("LAR") regarding an Equivalent Margins Analysis ("EMA") for the Palisades Nuclear Plant ("Palisades" or "PNP") submitted by Entergy Nuclear Operations, Inc. ("Entergy").<sup>1</sup> Pursuant to 10 C.F.R. § 2.309(i), the Staff of the U.S. Nuclear Regulatory Commission ("NRC Staff" or "Staff") hereby files its answer. As discussed below, the Petition should be denied because the Petitioners have not proffered an admissible contention.

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<sup>1</sup> Petition to Intervene and for a Public Adjudication Hearing of Entergy License Amendment Request for Approval of 10 CFR Part 50 Appendix G Equivalent Margins Analysis (Mar. 9, 2015) (Agencywide Documents Access and Management System ("ADAMS") Accession No. ML15068A458). Attached to the Petition were several declarations concerning the Petitioners' standing to intervene (Petition at 28-35) ("Standing Declarations"); Attached to the Petition were also the Declaration of Arnold Gunderson (Dec. 1, 2014) (ADAMS Accession No. ML15068A457) ("Gundersen Decl."); and Nuclear Reactor Pressure Vessel Crisis: Greenpeace Briefing (Feb. 15, 2015) (ADAMS Accession No. ML15068A456) ("Greenpeace Report").

## BACKGROUND

This proceeding involves an LAR submitted by Entergy on November 12, 2014, for Palisades, a nuclear power plant located in Covert, Michigan, five miles south of South Haven, Michigan, on the eastern shore of Lake Michigan. In its LAR, Entergy requested that the NRC approve its EMA, performed in accordance with 10 C.F.R. Part 50, Appendix G. Entergy stated that its EMA demonstrates that materials predicted to possess Charpy upper-shelf energy values less than 50 foot-pounds (“ft-lbs”) will provide margins of safety against fracture, equivalent to those required by Appendix G of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (“ASME Code”).<sup>2</sup> On January 6, 2015, the NRC published in the *Federal Register* a notice of opportunity to request a hearing on the LAR.<sup>3</sup> In response to this notice, Petitioners filed their March 9, 2015 request for hearing, in which they addressed their standing to intervene and proposed a single contention challenging Entergy’s LAR.<sup>4</sup>

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<sup>2</sup> Letter from Anthony Vitale, Site Vice President, to NRC, License Amendment Request for Approval of Palisades Nuclear Plant 10 CFR 50 Appendix G Equivalent Margins Analysis (Nov. 12, 2014), at 3 (ADAMS Accession No. ML14316A190) (“Entergy LAR”). Entergy enclosed with its LAR 5 attachments: Attachment 1 - Description and Assessment of Requested Change (Nov. 12, 2014) (ADAMS Accession No. ML14316A193) (“LAR Attachment 1”); Attachment 2 – Responses to Request for Additional Information Questions (Nov. 12, 2014) (ADAMS Accession No. ML14316A198); Attachment 3 – WCAP-17403-NP, Rev. 1, Palisades Nuclear Power Plant Extended Beltline Reactor Vessel Integrity Evaluation (Jan. 2013) (ADAMS Accession No. ML14316A199) (“LAR Attachment 3, WCAP-17403-NP”); Attachment 4 – WCAP-15353-NP, Sup. 2, Rev. 0, Palisades Reactor Pressure Vessel Fluence Evaluation (July 2011) (ADAMS Accession No. ML14316A207); Attachment 5 – WCAP-17651-NP, Rev. 0, Palisades Nuclear Power Plant Reactor Vessel Equivalent Margins Analysis (Feb. 2013) (ADAMS Accession No. ML14316A208) (“LAR Attachment 5, WCAP-17651-NP”). The LAR and the attachments can be viewed in a document package at ADAMS Accession No. ML14316A370

<sup>3</sup> Biweekly Notice; Applications and Amendments to Facility Operating Licenses and Combined Licenses Involving No Significant Hazards Considerations, 80 Fed. Reg. 520 (Jan. 6, 2015).

<sup>4</sup> Petitioners submitted a separate hearing request involving Entergy’s request for approval of its use of the alternate fracture toughness requirements for protection against pressurized thermal shock (“PTS”) events provided in 10 C.F.R. § 50.61a, in lieu of the requirements in 10 C.F.R. § 50.61. Amended Petition to Intervene and for a Public Adjudication Hearing of Entergy License Amendment Request for Authorization to Implement 10 CFR §50.61a, ‘Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events’ (Dec. 8, 2014) (ADAMS Accession No. ML14344A321) (“December 2014 Petition”). To the extent Petitioners raise arguments in the instant Petition related to the §50.61a LAR at issue in the December 2014 Petition, these arguments fall outside the scope of this proceeding and are inadmissible. See *infra* Section III.B.

Petitioners' request should be denied. Although the Staff submits that Petitioners have demonstrated standing, Petitioners have not submitted an admissible contention in accordance with 10 C.F.R. § 2.309(f)(1). Specifically, Petitioners' contention is inadmissible because it: (1) constitutes an impermissible challenge to the Commission's regulations; (2) fails to demonstrate a genuine dispute with Entergy's application; and (3) raises issues that fall outside the scope of this license amendment proceeding.

### DISCUSSION

#### I. Petitioners Have Demonstrated Standing to Intervene

Section 189.a.(1)(A) of the Atomic Energy Act ("AEA") requires the Commission to grant a hearing request by any person whose interest may be affected by the proceeding.<sup>5</sup> To demonstrate this interest, petitioners must submit written pleadings which set out:

- (i) The name, address and telephone number of the requestor or petitioner;
- (ii) The nature of the requestor's/petitioner's right under the [AEA] to be made a party to the proceeding;
- (iii) The nature and extent of the requestor's/petitioner's property, financial or other interest in the proceeding; and
- (iv) The possible effect of any decision or order that may be issued in the proceeding on the requestor's/petitioner's interest.<sup>6</sup>

To determine whether a petitioner has an interest sufficient to intervene, the Commission applies contemporaneous judicial concepts of standing, requiring the Petitioner to (1) allege an injury in fact that is (2) fairly traceable to the challenged action and (3) is likely to be redressed by a favorable decision.<sup>7</sup> The alleged injury in fact must be concrete and particularized, not conjectural or hypothetical.<sup>8</sup> Organizations may establish representational standing by demonstrating that at least one of their members, who has authorized the organization to

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<sup>5</sup> Atomic Energy Act of 1954, as amended, § 189.a.(1)(A), 42 U.S.C. § 2239(a)(1)(A)(1996).

<sup>6</sup> 10 C.F.R. § 2.309(d)(1).

<sup>7</sup> *Sequoyah Fuels Corp.* (Gore, Oklahoma Site), CLI-94-12, 40 NRC 64, 71-72 (1994).

<sup>8</sup> *Id.* at 72, citing *O'Shea v. Littleton*, 414 U.S. 488, 494 (1974).

represent his or her interest, will be injured by the possible outcome of the proceeding; and that the organizations' purposes are germane to the interest they seeks to protect.<sup>9</sup>

Here, the Petitioners have successfully demonstrated representational standing necessary to intervene. Each Petitioner attached an affidavit from one of its members authorizing the Petitioner to represent his or her interests in this proceeding. For example, Beyond Nuclear attached a declaration by one of its members, Bette Pierman, who lives 13 miles from the Palisades plant. In her declaration, Ms. Pierman claims Entergy's request for a license amendment is inadequate, that Entergy underestimated the possibility of through-wall cracking of the Palisades nuclear reactor vessels, and that by underestimating the risk Entergy increased the likelihood that she might be injured by radioactive releases during an accident.<sup>10</sup> Similar affidavits were filed by members of each of the other Petitioners alleging similar concerns.<sup>11</sup>

In their Petition, Petitioners argue that Entergy's EMA is inadequate, that the EMA's inadequacy increases the possibility that the reactor pressure vessel ("RPV") at Palisades will be breached during an accident, and that this could harm their members living near the plant.<sup>12</sup> In the past, the Commission has found similar concerns regarding the integrity of RPVs sufficient to establish standing, because "[t]he material condition of the plant's reactor vessel obviously bears on the health and safety of those members of the public who reside in the plant's vicinity."<sup>13</sup> The EMA, which is the subject of Entergy's LAR, relates to the integrity of the

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<sup>9</sup> *Consumers Energy Co.* (Palisades Nuclear Power Plant), CLI-07-18, 65 NRC 399, 409 (2007).

<sup>10</sup> See Declaration of Bette Pierman (Petition at 29).

<sup>11</sup> See Petition at 31, 33, 35.

<sup>12</sup> Petition at 5-10. However, with respect to an LAR, the proximity to the plant should not in itself serve as the basis in establishing standing.

<sup>13</sup> *Cleveland Elec. Illuminating Co.* (Perry Nuclear Power Plant, Unit 1), CLI-93-21, 38 NRC 87, 95-96 (1993) (finding standing where the challenged "amendment directly involve[d] surveillance of the reactor vessel's integrity.").

RPV. Thus, a deficiency in the licensee's application could result in unintended safety consequences. Therefore, the Staff does not challenge the Petitioners' standing to intervene.

## II. Regulatory Requirements of 10 C.F.R. Part 50, Appendix G

### A. Overview

To assure the structural integrity of the RPV, NRC regulations and regulatory guides have been developed to provide methods and procedures to establish that each RPV has adequate safety margins for continued operation.<sup>14</sup> For example, 10 C.F.R. §§ 50.61 and 50.61a address risks associated with RPV failure and provide fracture toughness screening criteria to ensure adequate resistance against postulated accident loading by pressurized thermal shock ("PTS") events. The Palisades LAR at issue here, however, concerns a different provision in the Commission's regulations: 10 C.F.R. Part 50, Appendix G, Section IV.A, which provides adequate margins of safety during any condition of normal operation. This is achieved, in part, by the requirements of Section IV.A.1.a, which impose a minimum value on the upper-shelf energy (that is, the toughness of steel at high temperatures) as measured by the Charpy test.

The steel from which the RPV is made transitions from low toughness to high toughness behavior as temperature increases. The effect of changes in temperature on the fracture toughness of steel is measured by a standardized test known as a Charpy V-notch test.<sup>15</sup> The Charpy test measures this toughness in terms of the energy required to break a small notched steel sample with a swinging pendulum; the energy is measured in "foot-pounds."<sup>16</sup> Charpy tests performed over a range of temperatures have established that fracture toughness has three levels, an "upper shelf" at higher temperatures where metals exhibit tough, ductile

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<sup>14</sup> Fracture Toughness Requirements for Light Water Reactor Pressure Vessels, 60 Fed. Reg. 65,456 (Dec. 19, 1995) (Final Rule).

<sup>15</sup> *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-90-4, 31 NRC 54, 58 (1990).

<sup>16</sup> See *id.* (noting that the "energy of a hammer absorbed in fracturing a metal specimen gives a measure of the metal's fracture toughness).



behavior, a “lower shelf” at lower temperatures where metals exhibit brittle behavior, and a transition range of temperatures between the upper and lower shelves where the metal's behavior turns from ductile, or fracture resistant, to brittle.<sup>17</sup> In a nuclear RPV the effects of neutron irradiation tend to, over time, have two effects on the Charpy properties: (1) they increase the temperature at which the steel transitions from low to high toughness (also called the “*transition temperature*”), and (2) they reduce the toughness in the upper shelf (also called the Charpy “*upper-shelf energy*,” or “USE”).

10 C.F.R. Part 50, Appendix G, Section IV contains requirements on upper-shelf energy, and includes limits on the reduction in upper-shelf energy. If the upper-shelf energy of the RPV beltline falls below the required minimum value (50 ft-lbs), the licensee may, subject to the review and approval of the Director of the Office of Nuclear Reactor Regulation (“NRR”), demonstrate the continued operational safety of the RPV by performing a more detailed and more accurate analysis that is based on the well-established principles of elastic plastic fracture mechanics (“EPFM”), valid for RPVs at and above the upper-shelf temperature.<sup>18</sup> This analysis has come to be called an “Equivalent Margins Analysis,” or EMA. The requirements of 10 C.F.R. Part 50, Appendix G are described in further detail below.

B. The Requirements of 10 C.F.R. Part 50, Appendix G

Appendix G to 10 C.F.R. Part 50 includes requirements to ensure that the ferritic materials in reactor vessels remain at a level of toughness necessary for safe operation over the lifetime of a nuclear power reactor. Specifically, Appendix G outlines fracture toughness requirements which provide adequate margins of safety during any condition of normal operation, including anticipated operational occurrences and system hydrostatic tests.<sup>19</sup> Section I of Appendix G defines the regulation’s scope and discusses which materials its requirements

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<sup>17</sup> *Turkey Point*, LBP-90-4, 31 NRC at 58.

<sup>18</sup> See 10 C.F.R. Part 50, App. G § IV(A)(1)(a).

<sup>19</sup> 60 Fed. Reg. at 65,458.

cover. Section II defines certain terms used in the Appendix. Section III includes fracture toughness testing requirements, incorporating the testing requirements of Appendix H for beltline materials. Finally, Section IV, in Section IV.A.1, includes the Charpy upper-shelf energy requirements for reactor vessel beltline materials. Section IV.A.2 establishes, by reference, pressure-temperature limits for normal operation which, effectively, place limits on the transition temperature of the steels in the RPV. The pressure-temperature limits are not a subject of this Petition.

10 C.F.R. Part 50, Appendix G, Section IV.A.1.a, at issue here for Palisades' LAR, requires that:

Reactor vessel beltline materials must have Charpy upper-shelf energy in the transverse direction for [plate] material and along the weld for weld material according to the ASME Code, of no less than 75 ft-lb (102 J) initially and must maintain Charpy upper-shelf energy throughout the life of the vessel of no less than 50 ft-lb (68 J), unless it is demonstrated in a manner approved by the Director, Office of Nuclear Reactor Regulation or Director, Office of New Reactors, as appropriate, that lower values of Charpy upper-shelf energy will provide margins of safety against fracture equivalent to those required by Appendix G of Section XI of the ASME Code[.]<sup>20</sup>

Section IV.A.1.a may be satisfied in one of two ways. Licensees may demonstrate that the Charpy upper-shelf energy of its material will remain at or above 50 ft-lbs. The 50 ft-lb limit is regarded as screening criteria, not as an absolute limit. Essentially, if a RPV steel has 50 ft-lbs or more energy absorption on the upper-shelf, the safety of this material for operation has been demonstrated without the need to perform further, more detailed, analysis. On the other hand, when a RPV steel is projected to drop below the 50 ft-lb limit, Appendix G of 10 C.F.R. Part 50, requires that additional analyses be performed to demonstrate the operating safety of the reactor. Under these conditions, licensees perform an EMA based on the principles of elastic plastic fracture mechanics or EPFM. The EMA determines whether a beltline material has a sufficient level of resistance to ductile tearing (*i.e.*, toughness) such that the RPV can be

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<sup>20</sup> 10 C.F.R. Part 50, App. G § IV(A)(1)(a) (footnote omitted).

operated safely even though the screening limit of 50 ft-lbs has not been met. If a licensee wishes to continue operating the vessel with upper-shelf energies below 50 ft-lbs, an EMA must be performed.

Section IV.A.1.b permits—but does not require—licensees to submit additional evidence of the fracture toughness of the beltline material from supplemental physical tests.<sup>21</sup> Section IV.A.1.c requires the licensee to submit its EMA for review at least three years prior to the date when the predicted Charpy upper-shelf energy will fall below 50 ft-lbs. If a licensee cannot demonstrate the existence of an equivalent margin of safety in accordance with the requirements of Section IV.A, then Appendix G, Section IV.B allows for continued operation once the licensee performs a thermal annealing treatment to recover the fracture toughness of the material, subject to the requirements of 10 C.F.R. § 50.66.

#### C. Relevant Guidance Documents

Regulatory Guide (RG) 1.99, Revision 2, “Radiation Embrittlement of Reactor Vessel Materials,” describes acceptable methods to estimate the Charpy upper-shelf energy of reactor beltline materials to account for the effects of embrittlement caused by irradiation.<sup>22</sup> Position 1.2 describes methods for calculating Charpy upper-shelf energy based upon the copper content and neutron fluence in the event that surveillance data are not available.<sup>23</sup> Position 2.2 describes methods for calculating Charpy upper-shelf energy when surveillance data are available.<sup>24</sup>

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<sup>21</sup> EMA guidance in Regulatory Guide 1.161 provides methods acceptable to the Staff to estimate fracture toughness from other evidence in the event that direct fracture toughness testing is not, or cannot, be performed. See Regulatory Guide 1.161, Evaluation of Reactor Pressure Vessels With Charpy Upper-Shelf Energy Less than 50 FT-LB., at 1.161-8 – 1.161-9 (June, 1995) (ADAMS Accession No. ML003740038) (“RG 1.161”).

<sup>22</sup> Regulatory Guide 1.99, Rev. 2, Radiation Embrittlement of Reactor Vessel Materials, at 1.99-1 (May, 1988) (ADAMS Accession No. ML003740284) (“RG 1.99”).

<sup>23</sup> *Id.* at 1.99-2–3.

<sup>24</sup> *Id.* at 1.99-3–5.

Appendix G, Section IV, does not include specific requirements for demonstrating equivalent margins of safety when reactor beltline material Charpy upper-shelf energy falls below 50 ft-lbs. However, RG 1.161, "Evaluation of Reactor Pressure Vessels with Charpy Upper-Shelf Energy Less than 50 ft-lb," describes methods acceptable to the NRC Staff for licensees to perform an EMA.<sup>25</sup> The methods of analysis in RG 1.161 are based, in part on, the methods developed for the ASME Code, Section XI, Appendix K.<sup>26</sup> The NRC Staff has reviewed the methods of Appendix K and has determined that they are technically acceptable but not complete.<sup>27</sup> RG 1.161 was developed to provide guidance on selecting transients for consideration and on appropriate materials properties to be used in the analyses.<sup>28</sup> RG 1.161 describes the acceptance criteria, analysis methods, material properties, and selection of transients that licensees may use in their EMA. RG 1.161 provides methods for modeling the J-integral fracture resistance ("J-R curve")<sup>29</sup> for the following classes of materials: welds manufactured with Linde 80 flux, generic welds, and high toughness plate materials.<sup>30</sup>

RG 1.161 provides calculations licensees may use to determine the effect of various loading conditions (e.g., normal operations, an emergency, and a loss of coolant event) on reactor vessel structural integrity using EPFM methods appropriate for use in the high-temperature, or upper-shelf, regime.<sup>31</sup> While more accurate than the 50 ft-lb screening limit, the

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<sup>25</sup> RG 1.161 at 1.161-1.

<sup>26</sup> *Id.* Appendix K "Assessment of Reactor Vessels with Low Upper Shelf Charpy Impact Energy Levels" to the ASME Code, Section XI (Appendix K) specifies the methodology to be used to evaluate the equivalent margins. The Appendix K methodology is based on the principles of elastic-plastic-fracture-mechanics (EPFM) and postulates flaws in the RPV at locations of predicted low upper shelf energy (USE). Appendix K further requires that the applied J-integral for these flaws shall be calculated and compared with the J-integral fracture resistance of the material to determine acceptability.

<sup>27</sup> RG 1.161 at 1.161-1.

<sup>28</sup> *Id.*

<sup>29</sup> The "J-R curve" quantifies the toughness of the RPV steels and in the manner needed for input to the EPFM calculations used to perform an EMA consistent with the guidance of RG 1.161.

<sup>30</sup> See RG 1.161 at 1.161-8 – 1.161.-11.

<sup>31</sup> RG 1.161 provides acceptance criteria based on EPFM for four transients: Level A (normal), Level B (upset), Level C (emergency), and Level D (faulted). *Id.* at 1.161-3 – 1.161.-4.

EPFM-based EMA procedures still retain significant conservatisms. For example, the guidance in RG 1.161 assumes flaws in the beltline material significantly larger than have been observed in any nuclear RPV.<sup>32</sup> Additionally, RG 1.161 adopts conservative estimates of both the beltline materials' fracture toughness, and of the potential loading that the materials would be subject to during normal operation or an accident.<sup>33</sup>

The EMA calculations in RG 1.161 are designed to demonstrate that the margins of safety against ductile fracture of an RPV with postulated flaws and with an upper-shelf energy less than 50 ft-lbs are equivalent to those in Appendix G of Section XI of the ASME Code. EMAs based on the principles of EPFM, consistent with the guidance of RG 1.161 and Appendix K to Section XI of the ASME Code, have been used, and approved, for numerous reactors.<sup>34</sup>

### III. Petitioners Have Not Proffered an Admissible Contention

#### A. Contention Admissibility Standards

##### 1. Contention Admissibility Factors in 10 C.F.R. § 2.309(f)(1)

In addition to demonstrating standing, for a hearing request to be granted, the requestor must propose at least one admissible contention that meets the requirements of 10 C.F.R.

§ 2.309(f)(1). Under § 2.309(f)(1), an admissible contention must:

(i) Provide a specific statement of the issue of law or fact to be raised or controverted. . .

(ii) Provide a brief explanation of the basis for the contention;

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<sup>32</sup> RG 1.161 at 1.161-3.

<sup>33</sup> See *id.* at 1.161-9 – 1.161-11.

<sup>34</sup> See, e.g., Letter from Patrick Milano, Senior Project Manager, NRC, to Dennis Koehl, Site Vice President, Nuclear Mgmt. Co, Point Beach Nuclear Plant, Units 1 and 2 – Issuance of Amendments Regarding Review of Reactor Vessel Fracture Mechanics Analysis (TAC Nos. MD2359 and MD2360) (May 10, 2007) (ADAMS Accession No. ML071300623); NUREG-2171, *Safety Evaluation Report Related to the License Renewal of Limerick Generating Stations, Units 1 and 2*, at 4-24 - 25 (Sep. 2014) (ADAMS Accession No. ML14276A156); NUREG-1766, *Safety Evaluation Report Related to the License Renewal of North Anna Power Station, Units 1 and 2, and Surry Power Station, Units 1 and 2*, at 3-60 (Dec. 2002) (ADAMS Accession No. ML030160825).

(iii) Demonstrate that the issue raised in the contention is within the scope of the proceeding;

(iv) Demonstrate that the issue raised in the contention is material to the findings the NRC must make to support the action that is involved in the proceeding;

(v) Provide a concise statement of the alleged facts or expert opinions which support the requestor's/petitioner's position on the issue and on which the petitioner intends to rely at hearing, together with references to the specific sources and documents on which the requestor/petitioner intends to rely to support its position on the issue; [and]

(vi) . . . [P]rovide sufficient information to show that a genuine dispute exists with the applicant/licensee on a material issue of law or fact. This information must include references to specific portions of the application (including the applicant's environmental report and safety report) that the petitioner disputes and the supporting reasons for each dispute, or, if the petitioner believes that the application fails to contain information on a relevant matter as required by law, the identification of each failure and the supporting reasons for the petitioner's belief[.]<sup>35</sup>

The Commission has emphasized that the 10 C.F.R. § 2.309(f)(1) contention admissibility requirements are "strict by design."<sup>36</sup> "Mere 'notice pleading' does not suffice."<sup>37</sup> Failure to comply with any one of the 10 C.F.R. § 2.309(f)(1) requirements is grounds for dismissing the proposed contention.<sup>38</sup>

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<sup>35</sup> 10 C.F.R. § 2.309(f)(1). A further provision, § 2.309(f)(1)(vii), applies only to Combined Operating License applications submitted under 10 C.F.R. Part 52.

<sup>36</sup> *Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station, Units 2 and 3), CLI-01-24, 54 NRC 349, 358 (2001), *petition for reconsid'n denied*, CLI-02-01, 55 NRC 1 (2002).

<sup>37</sup> *Amergen Energy Co., LLC* (Oyster Creek Nuclear Generating Station), CLI-06-24, 64 NRC 111, 119 (2006) (internal quotation omitted), *quoting Exelon Generation Co., LLC*, CLI-05-29, 62 NRC 801, 808 (2005).

<sup>38</sup> *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 325 (1999), *citing Arizona Pub. Serv. Co.* (Palo Verde Nuclear Generating Station, Units 1, 2, and 3), CLI-91-12, 34 NRC 149, 155-56 (1991). *See also South Carolina Elec. & Gas Co.* (Virgil C. Summer Nuclear Station, Units 2 and 3), CLI-10-1, 71 NRC 1, 7 & n.33 (2010), *quoting USEC Inc.* (American Centrifuge Plant), CLI-06-9, 63 NRC 433, 437 (2006) ("requirements are deliberately strict, and we will reject any contention that does not satisfy the requirements.").

## 2. Scope of NRC License Amendment Proceedings

Well-established NRC precedent limits the scope of NRC proceedings to the matters specified in the notice of hearing.<sup>39</sup> The *Federal Register* Notice issued for the instant LAR states, “[c]ontentions shall be limited to matters within the scope of the amendment under consideration.”<sup>40</sup> The Notice also states that the LAR requests approval of “the licensee’s equivalent margin analysis, performed in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 50, Appendix G, which demonstrates that materials predicted to possess Charpy upper shelf energy values less than 50 ft-lbs will provide margins of safety against fracture, equivalent to those required by Appendix G of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.”<sup>41</sup> Thus, any claims by a petitioner that do not relate to Entergy’s proposed changes to the current license are outside the scope of this proceeding. Moreover, Petitioners cannot challenge other amendments or NRC Staff actions related to reactor vessel integrity that are not part of the instant license amendment.

Additionally, challenges to NRC regulations are prohibited in an adjudicatory proceeding, unless a petition for waiver of the rules has been filed.<sup>42</sup> No such petition for waiver has been filed by Petitioners or granted by the Commission. As such, the Petitioners cannot challenge the provisions of 10 C.F.R. Part 50, Appendix G — they can only argue that the LAR fails to meet the requirements of 10 C.F.R. Part 50, Appendix G. Moreover, a § 2.206 petition is the proper means to ask the NRC to impose by order certain requirements, modifications, or

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<sup>39</sup> *Portland Gen. Elec. Co.* (Trojan Nuclear Plant), ALAB-534, 9 NRC 287, 289 n. 6 (1979), *citing Pub. Serv. Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 & 2), ALAB-316, 3 NRC 167, 170-71 (1976); *see also Dominion Nuclear Connecticut, Inc.* (Millstone Nuclear Power Station Unit 3), LBP-08-9, 67 NRC 421, 437 (2008), *aff’d*, CLI-08-17, 68 NRC 231, 240 (2008).

<sup>40</sup> 80 Fed. Reg. at 521.

<sup>41</sup> *Id.* at 523.

<sup>42</sup> 10 C.F.R. § 2.335(a). *See also Vermont Yankee Nuclear Power Corp. & AmerGen Vermont, LLC* (Vermont Yankee Nuclear Power Station), CLI-00-20, 52 NRC 151, 165-66 (2000) (noting that a petitioner in an individual adjudication cannot challenge generic decisions made by the Commission in rulemakings). 10 C.F.R. § 2.309(f)(1)(iii) (requiring contention to be within the scope the proceeding to be admissible).

activities at Palisades.<sup>43</sup> As the Commission noted, “[t]he 2.206 process provides stakeholders a forum to advance their concerns and to obtain full or partial relief, or written reasons why the requested relief is not warranted.”<sup>44</sup> Finally, it is well established that a petitioner cannot challenge the NRC’s “no significant hazards consideration” (“NSHC”) determination.<sup>45</sup>

B. Petitioners’ Contention is Inadmissible

Petitioners’ sole Contention states as follows:

The methods of prediction used by Entergy concerning whether steel plate and weld materials within the reactor pressure vessel (“RPV”) at the Palisades Nuclear Power Plant possess Charpy upper shelf energy (“USE”) values of less than 50 ft.-lbs. of ductility stress do not provide adequate assurance of margins of safety against fracture or rupture which are equivalent to those required by Appendix G of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.<sup>46</sup>

As described above, Appendix G to 10 C.F.R. Part 50 includes requirements to ensure that the reactor vessel beltline materials remain at a level of toughness necessary for continued safe operation. When the Charpy upper-shelf energy of a material drops or may drop below the 50 ft-lb regulatory limit, 10 C.F.R. Part 50, Appendix G, Section IV.A.1.a, requires licensees to demonstrate “in a manner approved by the Director [of NRR] that lower values of Charpy upper-shelf energy will provide margins of safety against fracture equivalent to those required by Appendix G of Section XI of the ASME Code.” This demonstration is performed using an analysis that is referred to as an EMA or “equivalent margins analysis.” To raise an admissible contention in this proceeding, a petitioner must argue—with expert support—that the applicant’s EMA is somehow deficient and fails to meet the requirements in 10 C.F.R. Part 50, Appendix G.

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<sup>43</sup> 10 C.F.R. § 2.206(a).

<sup>44</sup> *Southern California Edison Co.* (San Onofre Nuclear Generating Station, Units 2 and 3), CLI-12-20, 76 NRC 437, 439-40 (2012).

<sup>45</sup> 10 C.F.R. § 50.58(b)(6); *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant), CLI-01-07, 53 NRC 113, 118 (2001).

<sup>46</sup> Petition at 12.



Petitioners have not proffered an admissible contention. Moreover, Petitioners' arguments are markedly similar to arguments they raised in their December 2014 Petition regarding Entergy's § 50.61a LAR. Indeed, Petitioners even seek to incorporate by reference "the entirety of [the] contents and averments" of their December 2014 Petition,<sup>47</sup> and rely on the same expert affidavit used in their December 2014 Petition. However, the December 2014 Petition involved a different LAR, wherein Entergy requested approval of its use of the alternate fracture toughness requirements for protection against PTS events provided in 10 C.F.R. § 50.61a, in lieu of the requirements in 10 C.F.R. § 50.61.<sup>48</sup> As such, Petitioners' December 2014 Petition may not be incorporated by reference because challenges to the § 50.61a amendment are outside the scope of this proceeding, which is limited to challenges to the EMA (and the related Appendix G LAR) noticed in the *Federal Register* on January 6, 2015.<sup>49</sup> Likewise, to the extent Petitioners attempt to use the § 50.61a LAR in their instant Petition as basis and support for their contention,<sup>50</sup> these challenges are beyond the permissible scope of this proceeding.

Petitioners' also repeatedly state in both petitions that the calculations involved in § 50.61a LAR and the instant EMA LAR are not sufficient substitutes for the physical testing of surveillance capsules removed from the reactor. Petitioners argue that additional capsules should be withdrawn from the reactor vessel beyond those withdrawn under the withdrawal schedule approved under 10 C.F.R. Part 50, Appendix H.<sup>51</sup> However, as discussed in detail

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<sup>47</sup> Petition at 7.

<sup>48</sup> Entergy letter PNP 2014-049, "License Amendment Request to Implement 10 CFR 50.61a, 'Alternate Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events'" (Jul. 29, 2014), at 3 (ADAMS Accession No. ML14211A524) ("§ 50.61a LAR").

<sup>49</sup> As noted above, the Appendix G Amendment was submitted to the NRC on November 12, 2014. On January 6, 2015, the Appendix G Amendment was noticed in the *Federal Register*. 80 Fed. Reg. at 523. The Notice provided that members of the public whose interests may be affected by the amendment have 60 days from the date of the publication of the notice to submit a request for a hearing on that amendment. 80 Fed. Reg. at 521.

<sup>50</sup> See Petition at 12-15, 17, 19.

<sup>51</sup> *Id.* at 18-19, 22-24.

below, Petitioners assertions amount to an impermissible challenge to the Commission's regulations and to the surveillance program at Palisades, not to Entergy's compliance with the regulations in its LARs. Petitioners may not use these license amendment proceedings as a backdoor to file a challenge to the approved modified withdrawal schedule.

Additionally, Petitioners raise several miscellaneous challenges to matters that are inadmissible because they either fail to raise a genuine dispute with the application or fall beyond the scope of this proceeding, which is limited to the EMA amendment noticed in the *Federal Register*. Petitioners also challenge the Staff's NSHC determination,<sup>52</sup> such a challenge, however, is not the proper subject for adjudication.<sup>53</sup> For these reasons, as discussed in detail below, the Petition fails to present an admissible contention.

1. Petitioners' Assertions that Surveillance Data is Required for the EMA Constitute an Impermissible Challenge to the Commission's Regulations, Fall Outside the Scope of this Proceeding, and Are Otherwise Inadmissible
  - a. Petitioners' Challenges to the Surveillance Program at Palisades are Inadmissible

Petitioners assert that the continued operation of Palisades "is not assured by mere calculated predictions" and that "a genuine estimate of safety further requires consideration of physical ductile strength testing of coupon material which reposes within the Palisades RPV."<sup>54</sup> Petitioners are essentially arguing that the EMA is insufficient because it is based on calculations instead of measured data from surveillance testing as described by 10 C.F.R. Part 50 Appendix H. However, Petitioners do not point to any provision in the Commission's regulations that requires Entergy to perform additional physical testing on the steel coupons stored in surveillance capsules as part of completing an EMA. As explained above, Section IV.A.1.b of 10 C.F.R. Part 50, Appendix G permits, *but does not require*, licensees to submit

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<sup>52</sup> Petition at 8-9.

<sup>53</sup> See discussion *supra* at 28.

<sup>54</sup> Petition at 2.

additional evidence of the fracture toughness of the beltline material from supplemental physical tests. Thus, Petitioners' assertion that some additional requirement must be imposed in lieu of—or in addition to—conducting an EMA as required under 10 C.F.R. Part 50, Appendix G impermissibly challenges the adequacy of the rule itself, rather than the adequacy of Entergy's license amendment request.

Appendix H describes the requirements for a reactor's material surveillance program, including the withdrawal schedule for surveillance capsules.<sup>55</sup> The purpose of the material surveillance program required by Appendix H is to monitor changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region of light water nuclear power reactors which result from exposure of these materials to neutron irradiation and the thermal environment.<sup>56</sup> Under the program, fracture toughness test data are obtained from material specimens exposed in surveillance capsules, which are withdrawn periodically from the reactor vessel.<sup>57</sup> Appendix H states that the design of the surveillance program and the withdrawal schedule must meet the requirements of the appropriate edition of ASTM E 185.<sup>5859</sup> Surveillance specimen capsules must be located near the inside vessel wall in the beltline region so that the specimen irradiation history duplicates, to the extent practicable within the

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<sup>55</sup> 10 C.F.R. Part 50, App. H § III(B)(1).

<sup>56</sup> 10 C.F.R. Part 50, App. G § I.

<sup>57</sup> *Id.* These data are used as described in Section IV, "Fracture Toughness Requirements," of Appendix G to Part 50.

<sup>58</sup> ASTM E 185-73, Standard Recommended Practice for Surveillance Tests for Nuclear Reactor Vessels; ASTM E 185-79, Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels; and ASTM E 185-82, Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels, have been approved for incorporation by reference by the Director of the *Federal Register*. 10 C.F.R. Part 50, App. H § I. The standard practice covers procedures for monitoring the radiation-induced changes in the mechanical properties of ferritic materials in the beltline of light-water cooled nuclear power reactor vessels. ASTM E185-82 at 1. It includes guidelines for designing a minimum surveillance program, selecting materials, and evaluating test results. ASTM E185-82 at 1. The standard practice was developed for all light-water cooled nuclear power reactor vessels for which the predicted maximum neutron fluence ( $E > 1$  MeV) at the end of the design lifetime exceeds  $10^{17}$  n/cm<sup>2</sup> at the inside surface of the reactor vessel. ASTM E185-82 at 1.

<sup>59</sup> 10 C.F.R. Part 50, App. H § III(B).

physical constraints of the system, the neutron spectrum, temperature history, and maximum neutron fluence experienced by the reactor vessel inner surface. In accordance with Appendix H, licensees must submit their capsule withdrawal schedules to the NRC for approval.<sup>60</sup>

In asserting that additional capsules should be withdrawn from the reactor vessel, Petitioners note that “abundant capsule coupon samples” remain in the reactor vessel and are available for testing, and that 16 years will have passed between 2003 and 2019 when another one will be removed.<sup>61</sup> However, as discussed above, 10 C.F.R. Appendix G does not require the licensee to withdraw additional capsules in performing an EMA. Moreover, the capsule withdrawal schedule is governed by 10 C.F.R. Part 50, Appendix H, which is a separate provision not within the scope of this proceeding.

In 2006, Entergy submitted a request for approval of its revised Appendix H withdrawal schedule.<sup>62</sup> Entergy explained that it had already withdrawn four capsules from the reactor and proposed to modify the schedule for the withdrawal of a fifth capsule.<sup>63</sup> In 2007, the NRC approved the plant’s modified withdrawal schedule because it satisfied the requirements of ASTM E 185-82 and 10 C.F.R. Part 50, Appendix H.<sup>64</sup> Petitioners’ apparent challenge to the approved capsule withdrawal schedule is inadmissible, as it relates to a prior approval pursuant to 10 C.F.R. Part 50, Appendix H, not the amendment at issue in this proceeding.

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<sup>60</sup> 10 C.F.R. Part 50, App. H § III(B)(3).

<sup>61</sup> Petition at 13-14, 18-19.

<sup>62</sup> See Letter from Paul Hardin, Site Vice President, Nuclear Mgmt. Co., LLC to NRC, Revision to Reactor Vessel Surveillance Coupon Removal Schedule (Sept. 19, 2006) (ADAMS Accession No. ML062630071). See also Letter from Travis Tate, Acting Chief, NRC, to Michael Balduzzi, Sr. Vice President, Entergy, Palisades Nuclear Plant - Approval of Proposed Reactor Vessel Surveillance Capsule Withdrawal Schedule (TAC No. MD3461) (Aug. 14, 2007), and attached Safety Evaluation by the Office of Nuclear Reactor Regulation Surveillance Capsule Withdrawal Schedule Palisades Nuclear Plant Nuclear Management Company Docket No. 50-255. (ADAMS Accession No. ML071640310) (“2007 SE”).

<sup>63</sup> 2007 SE at 2.

<sup>64</sup> *Id.* at 3.

b. Petitioners' Assertions Regarding Excluded Surveillance Capsule Data Are Inadmissible

Petitioners also argue that in the early 1980s, the NRC authorized the deletion of fluence data from Surveillance Capsule A-60 which would have shown that Palisades should be shut down, and that disregarding Capsule A-60 distorts the analytical basis for continued operation.<sup>65</sup> However, Petitioners' assertions regarding Capsule A-60 have no relevance to the EMA or this proceeding. Capsule A-60 was deleted from the Reactor Vessel Surveillance Capsule Program over 30 years ago, and the Reactor Vessel Surveillance Coupon Removal Schedule was modified to provide the option of removing an equivalent capsule instead of the primary capsule in a separate licensing action.<sup>66</sup> That amendment was the subject of a separate notice of opportunity to request a hearing,<sup>67</sup> and is beyond the scope of this proceeding concerning Entergy's EMA.<sup>68</sup> Moreover, the Petitioners' claim that data from Capsule A-60 must be utilized here, either instead of or in addition to the data obtained from capsules withdrawn under the Applicant's Appendix H capsule withdrawal program, constitutes an impermissible challenge to the Commission's rules. Therefore, Petitioners' claims regarding the exclusion of Capsule A-60 from Entergy's capsule withdrawal program should be rejected.

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<sup>65</sup> Petition at 14-15 (citing Gundersen Decl. at ¶¶ 41-42).

<sup>66</sup> Letter from Walter A. Paulson, Project Manager, NRC, to David J. VandeWalle, Nuclear Licensing Administrator, Consumers Power Co., Reactor Vessel Surveillance Capsule Program, enclosing (1) Amendment No. 79, Amendment to Provisional Operating License No. DPR-20 for the Palisades Plant, and (2) the Staff's supporting safety evaluation (Feb. 28, 1984) (ADAMS Accession No. ML020800206) ("SER").

<sup>67</sup> Monthly Notice; Applications and Amendments to Operating Licenses Involving No Significant Hazards Considerations, 48 Fed. Reg. 49,574, 49,583 (Oct. 26, 1983) (providing a hearing opportunity).

<sup>68</sup> As noted in the Staff's SER for Amendment 79, at 1-2, at the time of issuance the Palisades reactor vessel material surveillance program contained two capsules that are located outside the core barrel (Capsule A-60 and Capsule A-240), six capsules that are located at the midplane of the core and two capsules that are located in a low flux region above the core. The SER noted that Capsule A-60 and Capsule A-240 were located in positions within the reactor vessel that are diametrically opposite each other and had similar neutron fluences and temperatures. The SER concluded that, because Capsule A-240 had been withdrawn and tested, it could be used to predict the end-of-life material properties of the Palisades reactor vessel, making withdrawal and testing of Capsule A-60 unnecessary. Thus, although beyond the scope of this proceeding, Petitioners' assertion that the deletion of Capsule A-60 deletes important data, ignores the conclusions of the SER for Amendment 79 that Capsule A-240 already provided the needed information.

c. Petitioners Assertions that Palisades is Operating as a Test are Inadmissible

Petitioners assert that “[c]ontinued operation of the Palisades nuclear power plant without analyzing the coupon designated to be sampled more than seven years ago means that Entergy may be operating Palisades as a *test* according to 10 C.F.R. § 50.59.”<sup>69</sup> It is unclear what Petitioners mean here. Section 50.59, establishes a process whereby a licensee may determine whether it needs to submit a license amendment application for a proposed change. Under 10 C.F.R. § 50.59(c)(1), a licensee may make changes to a facility and conduct tests and experiments not listed in the plant’s final safety analysis report if those changes do not meet the criteria in subsection (c)(2). If the criteria in § 50.59(c)(2) are met, the licensee must submit a license amendment application in order to make the changes or conduct the test or experiment. This proceeding, however, does not concern whether Entergy failed to submit an LAR; to the contrary, the instant proceeding is about an LAR that Entergy submitted. Thus, Section 50.59 appears to have no bearing on whether Entergy or the Staff should look at additional surveillance data with respect to an EMA. In any event, previous changes to the reactor coupon withdrawal schedule are not within the scope of the instant LAR and do not contravene the requirements of 10 C.F.R. Part 50, Appendix G. In sum, the Petitioners’ reference to these matters does not support an admissible contention.

2. Petitioners’ Assertions Regarding the EMA Impermissibly Challenge the Commission’s Regulations, Are Immaterial, Fail to Raise a Genuine Dispute with the Application, are Out of Scope, and are Inadmissible

a. Petitioners’ Assertions Regarding the EMA Methodology are Inadmissible

Petitioners’ expert, Dr. Gunderson, asserts in his declaration that Entergy’s EMA is an “untried methodological approach” and a “red flag indicating that the reactor vessel at Palisades

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<sup>69</sup> Petition at 18, *citing* Gunderson Decl. at ¶ 8 (emphasis in original).

is operating in more uncharted territory than imagined.”<sup>70</sup> However, Dr. Gunderson provides no specific challenge to any portion of the EMA; therefore, Petitioners’ assertions fail to raise a genuine dispute with the application and are inadmissible.<sup>71</sup> Moreover, 10 C.F.R. Part 50, Appendix G, Section IV(A)(1)(a) specifically requires a demonstration of “margins of safety against fracture equivalent to those required by Appendix G of Section XI of the ASME Code” (a.k.a. “equivalent margins”) for RPV materials not meeting the NRC minimum required 50 ft-lbs for upper-shelf energy. Thus, to the extent Petitioners assert that the EMA’s methodological approach is insufficient, these assertions impermissibly challenge to the Commission’s regulations and are inadmissible.

Finally, Petitioners provide no support for their assertion that an EMA is an “untried methodological approach.” As explained above, the methodological approach used for the EMA is reflected in NRC regulatory guidance, RG 1.161, and also as part of Appendix K to Section XI of the ASME Code, both of which were adopted in the mid-1990s. These methodologies have been used numerous times by licensees seeking to comply with the requirements of 10 C.F.R. Part 50, Appendix G.<sup>72</sup> Petitioners’ conclusory statements are thus insufficient to support an admissible contention.<sup>73</sup>

b. Petitioners’ Claims Regarding Nickel Impurities are Inadmissible

Petitioners state that Palisades has “above-normal” sulfur content, and therefore Palisades takes credit for the nickel content in the RPV for increasing toughness against upper-shelf energy loss.<sup>74</sup> Petitioners argue that the EMA fails to account for the fact that nickel

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<sup>70</sup> Gunderson Decl. ¶¶ 45-48; Petition at 15, 17-18.

<sup>71</sup> See 10 C.F.R. § 2.309(f)(1)(vi).

<sup>72</sup> See *supra* note 34.

<sup>73</sup> See 10 C.F.R. § 2.309(f)(1)(v).

<sup>74</sup> Petition at 19-20 (quoting LAR Attachment 5, WCAP-17651-NP, at 5-2).

impurities "worsen RPV neutron embrittlement and PTS risk."<sup>75</sup> As support for their assertions regarding nickel impurities, Petitioners cite a response to a request for additional information from 1998 for the H.B. Robinson plant.<sup>76</sup>

Petitioners do not raise an admissible contention because Petitioners have not demonstrated how nickel content's effects on embrittlement are relevant to the licensee's calculations in the LAR. Entergy used RG 1.99, Rev. 2 to determine whether the upper-shelf energy for the Palisades RPV would drop below the 50 ft-lb limit outlined in 10 C.F.R. Part 50, Appendix G.<sup>77</sup> RG 1.99 estimates the Charpy upper-shelf energy of reactor beltline materials to account for the effects of embrittlement caused by irradiation.<sup>78</sup> However, RG 1.99 specifies that only copper content, product form (plate or weld), and neutron fluence are needed in determining the upper-shelf energy drop and makes no mention of nickel.<sup>79</sup> Petitioners do not discuss or provide any support as to why nickel content would be relevant to these calculations in the EMA, or how these calculations are somehow deficient.

Once Entergy determined that an EMA was required due to the reduction in upper-shelf energy, Entergy used RG 1.161 to perform their EMA.<sup>80</sup> RG 1.161 uses principles of EPFM, valid for RPVs at and above the upper-shelf temperature. These calculations are concerned with fracture toughness in the upper-shelf region and the possibility of ductile failure. Consistent with the RG 1.99 approach of predicting upper-shelf energy drop without using nickel, RG 1.161

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<sup>75</sup> Petition at 20.

<sup>76</sup> *Id.* (citing H. B. Robinson Steam Electric Plant, Unit 2, Response to Request for Additional Information Regarding Reactor Pressure Vessel Integrity, Attachment to Serial: RNP-RA/98-133, Page 10 of 13 – Page 11 of 13 (July 23, 1998) (ADAMS Accession No. ML14178B146).

<sup>77</sup> LAR Attachment 3, WCAP- 17403-NP, at 7-1 – 7-2.

<sup>78</sup> RG 1.99, at 1.99-1.

<sup>79</sup> See RG 1.99, at 1.99-3 (noting that Charpy upper-shelf energy should be assumed to decrease as a function of fluence and copper content).

<sup>80</sup> LAR Attachment 1, at 3.



does not use nickel either to determine the J-R curves in the EMA.<sup>81</sup> Petitioners again do not explain why nickel content is relevant to these calculations in the EMA or how these calculations are deficient. For these reasons, Petitioners' contention is inadmissible because Petitioners do not demonstrate that the increase in nickel content is material to the findings the NRC must make regarding the EMA.<sup>82</sup>

Moreover, Petitioners' arguments referencing PTS risk appear to challenge Entergy's compliance with the PTS regulations at 10 C.F.R. §§ 50.61 and 50.61a, not the EMA. An EMA addresses concerns with fracture toughness in the upper-shelf region and the possibility of ductile tearing, while PTS relates to brittle fracture in the lower-shelf and transition region. These issues are dealt with separately by NRC regulations. Petitioners do not point to any regulation or other document which states that the EMA is deficient unless it separately accounts for PTS risk. Rather, PTS concerns are addressed by separate provisions of the Commission's regulations, which are not at issue in this proceeding. Thus, Petitioners' assertions fall beyond the scope of this proceeding.<sup>83</sup>

Furthermore, Petitioners do not explain how their citation to the H.B. Robinson response supports their claims regarding nickel impurities. In fact, while the H.B. Robinson response addresses the metal content of a particular weld wire heat, it says nothing about the effect of nickel impurities on embrittlement and PTS risk. Therefore, Petitioners' contention is inadmissible because Petitioners have not provided sufficient information to demonstrate that there is a genuine dispute on a material issue of fact.<sup>84</sup>

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<sup>81</sup> See RG 1.161, at 1.161-9.

<sup>82</sup> See 10 C.F.R. § 2.309(f)(1)(iv). The effects of nickel on RPV material embrittlement are addressed separately in licensee's pressure-temperature limits, as required by 10 C.F.R. Part 50, Appendix G § IV(A)(2) and PTS, as required by 10 C.F.R. §§ 50.61 and 50.61a.

<sup>83</sup> See 10 C.F.R. § 2.309(f)(1)(iii).

<sup>84</sup> See 10 C.F.R. § 2.309(f)(1)(vi).

Finally, Petitioners state that “the higher sulfur content of the plates means lower fracture toughness.”<sup>85</sup> However, Petitioners do not assert that because of the higher sulfur content, the EMA somehow fails to meet the requirements of Appendix G of 10 C.F.R. Part 50 to provide equivalent margins of safety to those required by Appendix G of Section XI of the ASME Code. Thus, Petitioners do not raise a genuine dispute with the LAR.<sup>86</sup>

For these reasons, Petitioners’ contention is inadmissible because it falls outside the scope of this proceeding, is immaterial, provides insufficient support, and fails to raise a genuine dispute with the application.<sup>87</sup>

c. Petitioners’ Argument that Ductile Tearing is Not Well Understood is Inadmissible

Petitioners, quoting NRC RG 1.161, assert that ductile tearing in low Charpy USE materials is not well understood. Specifically, Petitioners cite the following passage from RG 1.161: “The conditions governing cleavage mode-conversion of the ductile tearing process in materials with low Charpy upper-shelf energy are still not well understood and are not considered in this regulatory guide.”<sup>88</sup> Petitioners state they have “seen no later regulatory guidance which demonstrates any greater understanding of ductile tearing.”<sup>89</sup> However, Petitioners’ claim is inadmissible. First of all, Petitioners appear to be reading the regulatory

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<sup>85</sup> Petition at 20.

<sup>86</sup> On May 13, 2014, the NRC Staff issued a request for additional information (RAI). Request for Additional Information – Palisades Nuclear Plant 10 CFR Appendix G Equivalent Margin Analysis – MF 2962 (May 13, 2014) (ADAMS Accession No. ML14133A684). The RAI noted that the licensee used the high-toughness/low-sulfur model from RG 1.161 in its EMA for high sulfur plates. The Staff requested that the licensee use the high-sulfur model in NUREG/CR-5265 to demonstrate that the updated safety factors and crack stability criterion would be satisfied using the high-sulfur model. The licensee submitted its response on June 12, 2014. Letter from Anthony Vitale, Site Vice President, Entergy, to NRC, Response to NRC Request for Additional Information – Palisades Nuclear Plant 10 CFR 50 Appendix G Equivalent Margin Analysis – MF 2962 (June 12, 2014) (ADAMS Accession No. ML14163A662); LAR Attachment 2. Petitioners have not challenged the licensee’s revised calculations in the LAR using the high-sulfur model.

<sup>87</sup> See 10 C.F.R. § 2.309(f)(1)(iii)-(vi).

<sup>88</sup> Petition at 21, *citing* RG 1.161 at 3.

<sup>89</sup> *Id.*

guide out of context – what is not well understood are the *conditions governing cleavage-mode conversion*, not ductile tearing in general or the EMA methodology accounting for the ductile tearing process. Moreover, Petitioners do not explain how their concerns regarding cleavage mode-conversion and ductile tearing raise a genuine dispute with the LAR's EMA. Petitioners merely assert that a phenomenon is not understood or considered in RG 1.161, but do not challenge any specific portion of the LAR. Thus, Petitioners' assertions are inadmissible.<sup>90</sup>

d. Petitioners Claims Regarding Microcracking Are Inadmissible

Petitioners make several arguments concerning microcracking. Petitioners state that the Greenpeace Report describes how high-pressure hydrogen gas trapped in the metal during the steel making process causes microcracks.<sup>91</sup> Petitioners assert that metal coupons are not under pressure<sup>92</sup> and therefore do not provide information representing the worst case.<sup>93</sup> Petitioners state that Palisades should be examined for evidence of the microcracks.<sup>94</sup> Petitioners also assert that "[a] mere projected equivalent margins analysis should not be allowed to stand against serious physical investigation into the status" of the Palisades RPV.<sup>95</sup>

Petitioners' argument, at its heart, targets the Commission's regulations, not the LRA, and does not support admission of a contention. Simply put, Petitioners fail to explain how their arguments concerning microcracking raise any specific dispute with the EMA. Instead of pointing to a section of the EMA that is deficient or arguing that a regulation is not met, Petitioners state that an EMA cannot be used in the place of physical investigation, and that

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<sup>90</sup> See 10 C.F.R. § 2.309(f)(1)(vi).

<sup>91</sup> Petition at 21.

<sup>92</sup> Petitioners do not discuss the actual pressures experienced by the coupons currently in the reactor.

<sup>93</sup> Petition at 22.

<sup>94</sup> *Id.*

<sup>95</sup> *Id.*

further destructive coupon testing is required.<sup>96</sup> Yet this is merely a repackaging of arguments Petitioners raised before. As explain above, Petitioners do not point to any provision in the Commission's regulations that requires Entergy to perform physical testing of capsules in completing an EMA. Thus, Petitioners impermissibly challenge the regulations.<sup>97</sup>

Moreover, Petitioners' request that Palisades should be made a priority for destructive coupon testing and for examinations for microcracking<sup>98</sup> is a request for action, not a dispute with the LRA. Under long-standing Commission precedent, such request for action must be made under 10 C.F.R. § 2.206.<sup>99</sup> Accordingly, Petitioners' assertions are inadmissible and fall beyond the permissible scope of this proceeding.

Petitioners also state that because the metal coupons are not under pressure, data from the coupons "would not represent the worst case."<sup>100</sup> However, this claim is inadmissible because it does not challenge the LAR. Coupon testing is not at issue in this proceeding. If Petitioners believe that a requirement concerning pressure<sup>101</sup> must be added to Section III.B.2 of Appendix H to Part 50, or to ASTM E 185 as incorporated into the Commission's rules, then relief lies with a rulemaking petition under 10 C.F.R. § 2.802, not with a hearing on the EMA.

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<sup>96</sup> Petition at 22.

<sup>97</sup> See *supra* note 42.

<sup>98</sup> Petition at 22.

<sup>99</sup> See *supra* notes 43, 44.

<sup>100</sup> Petition at 22.

<sup>101</sup> The Petitioners' assertion that coupons must be under pressure suggests that Petitioners misread the Greenpeace report. With respect to pressure, the Greenpeace report stated, "The presence of hydrogen flakes was a result of small ruptures in the carbon steel material produced by the release of high-pressure hydrogen gas, which was trapped in the metal during the steel making process." Greenpeace Report at 2 (unnumbered). Obviously, if the coupons were under higher pressure, the differential pressure would discourage release of any high-pressure hydrogen gas, thus maintaining the coupons under higher pressure would not produce the worst case desired by Petitioners.

e. Petitioners' Assertion Regarding the Draft Guidance is Inadmissible

Petitioners argue that the Palisades EMA should not be accepted because it is "predicated on non-final guidance."<sup>102</sup> However, the non-final guidance Petitioners refer to is guidance for 10 C.F.R. § 50.61a, which concerns PTS, not the EMA. Moreover, Petitioners do not assert that the EMA relies on this PTS guidance at all. And in any event, Petitioners do not point to any specific errors or omissions in the EMA and associated LRA that resulted from the EMA being "predicated on non-final guidance." Accordingly, Petitioners' argument does not support admission of a contention because it is out of scope and fails to raise a genuine dispute with the application.<sup>103</sup>

f. Petitioners' Assertion regarding Scarcity of Embrittlement Data is Inadmissible

Toward the end of their Petition, Petitioners challenge the surveillance program at Palisades and again ask for further destructive testing of surveillance capsules.<sup>104</sup> Petitioners, quoting RG 1.161, assert that the NRC admits the scarcity of embrittlement data yet declines to order physical destructive testing.<sup>105</sup> Specifically, Petitioners cite the following passage from RG 1.161: "Unfortunately, the specific material of interest (i.e., the material from the beltline region of the reactor vessel under operation) is seldom available for testing. Thus, testing programs have used generic materials that are expected to represent the range of actual materials used in fabricating reactor pressure vessels in the United States."<sup>106</sup> However, Petitioners' claim is outside the scope of this proceeding. As explained above, 10 C.F.R. Part 50 Appendix G does

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<sup>102</sup> Petition at 22.

<sup>103</sup> See 10 C.F.R. § 2.309(f)(1)(iii), (vi).

<sup>104</sup> Petition at 23.

<sup>105</sup> *Id.* at 23, *citing* RG 1.161 at 1.161-2.

<sup>106</sup> RG 1.161 at 1.161-2.

not require licensees to perform additional physical destructive testing to conduct an EMA.

Accordingly, Petitioners' argument does not support admission of a contention.<sup>107</sup>

g.      Petitioners' Assertions Regarding Substantial Advantage Under Appendix H Are Inadmissible

Petitioners also assert that 10 C.F.R. Part 50, Appendix H, Section III.C.1.e, requires a demonstration of substantial advantage to be gained if coupons are not evaluated and that "Entergy has made no showing of any substantial advantage to be gained from a 16-year hiatus from destructive testing . . ."<sup>108</sup> Petitioners further argue that avoidance of worker radiation dose as a reason for avoiding metal surveillance coupon testing at Palisades should not be deemed acceptable because Entergy was recently cited for exposing workers to a 2.8 Rem dose in 2014.<sup>109</sup>

Petitioners' contention is inadmissible. As explained above, the NRC approved Entergy's modified capsule withdrawal schedule in 2007 because it satisfied the requirements of ASTM E 185-82 and 10 C.F.R. Part 50, Appendix H.<sup>110</sup> Thus, Petitioners' challenge to the approved capsule withdrawal schedule is inadmissible, as it relates to a prior approval pursuant to 10 C.F.R. Part 50, Appendix H, not the amendment at issue in this proceeding. Moreover, Petitioners assertions regarding both the withdrawal schedule and the dose to which workers were exposed are entirely unrelated to Entergy's EMA and do not identify any errors or omissions in Entergy's LAR.

Additionally, Petitioners' arguments concerning Appendix H relate to requirements for an integrated surveillance program. Palisades, however, has a plant-specific surveillance program. Appendix H, Section III.C.1.e, discussing the approval criteria for integrated surveillance

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<sup>107</sup> See 10 C.F.R. § 2.309(f)(1)(iii).

<sup>108</sup> Petition at 24.

<sup>109</sup> *Id.*

<sup>110</sup> 2007 SE at 3.

programs, states that “[t]here must be substantial advantages to be gained, such as reduced power outages or reduced personnel exposure to radiation, as a direct result of not requiring surveillance capsules in all reactors in the set.”<sup>111</sup> Thus, Appendix H, Section III.C.1.e is unrelated to the modified withdrawal schedule for Palisades’ plant-specific surveillance program.

Accordingly, the Petitioners’ argument does not support admission of a contention because it is out of scope and fails to raise a genuine dispute with the application.<sup>112</sup>

3. The Petitioners’ Challenge to the Staff’s No Significant Hazards Consideration Determination is Inadmissible

Petitioners also contend that the Staff’s NSHC determination is inadequate, relies upon unsupported assumptions, and does not satisfy the standards of 10 C.F.R. § 50.92.<sup>113</sup> This assertion does not present an admissible contention. Apart from discretionary review by the Commission, the Staff’s NSHC determination is final and may not be contested by any party.<sup>114</sup> Moreover, the Commission’s regulation at 10 C.F.R. § 50.58(b)(6) specifically states that,

No petition or other request for review of or hearing on the staff’s significant hazards consideration determination will be entertained by the Commission. The staff’s determination is final, subject only to the Commission’s discretion, on its own initiative, to review the determination.

Thus, the Petitioners’ assertions concerning the Staff’s NSHC determination must be rejected.<sup>115</sup>

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<sup>111</sup> 10 C.F.R. Part 50, App. H. § III(C)(1)(e).

<sup>112</sup> See 10 C.F.R. § 2.309(f)(1)(iii), (vi).

<sup>113</sup> Petition at 11.

<sup>114</sup> *Shearon Harris*, CLI-01-07, 53 NRC at 118-19.

<sup>115</sup> *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-08-18, 68 NRC 533, 541 (2008).

CONCLUSION

For the reasons discussed above, the NRC Staff respectfully submits that the Petitioners have not proffered an admissible contention, as required by 10 C.F.R. § 2.309(f)(1)(i)-(vi). Rather, the Petition presents impermissible challenges to the Commission's regulations, fails to demonstrate a genuine dispute with Entergy's LAR, and raises numerous issues that are beyond the scope of this proceeding. Accordingly, the Petition should be denied.

Respectfully submitted,

**/Signed (electronically) by/**

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Dated at Rockville, Maryland  
this 3rd day of April, 2015



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
ENTERGY NUCLEAR OPERATIONS, INC.	)	Docket No. 50-255-LA2
	)	
(Palisades Nuclear Plant)	)	

Pursuant to 10 C.F.R. § 2.305, I hereby certify that copies of the foregoing "NRC STAFF'S ANSWER TO PETITION TO INTERVENE AND HEARING REQUEST FILED BY BEYOND NUCLEAR, DON'T WASTE MICHIGAN, MICHIGAN SAFE ENERGY FUTURE-SHORELINE CHAPTER, AND THE NUCLEAR ENERGY INFORMATION SERVICE," dated April 3, 2015, have been served upon the Electronic Information Exchange, the NRC's E-Filing System, in the above-captioned proceeding, this 3rd day of April, 2015.

**Signed (electronically) by**

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Dated at Rockville, Maryland  
this 3rd day of April, 2015