

**UNITED STATES OF AMERICA  
BEFORE THE NUCLEAR REGULATORY COMMISSION**

**Before the Atomic Safety and Licensing Board**

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In the Matter of	)	Docket No. 50-255-LR
NUCLEAR MANAGEMENT COMPANY	)	ASLBP No. 05-842-03-LR
PALISADES NUCLEAR GENERATING	)	
STATION	)	
Regarding the Renewal of Facility Operating	)	
License No. DPR-20 for a 20-Year Period	)	September 16, 2005
_____	)	

**PETITIONERS' COMBINED REPLY TO NRC STAFF  
AND NUCLEAR MANAGEMENT COMPANY ANSWERS**

Now come the Nuclear Information and Resource Service, *et al.*, Petitioners-Intervenors herein (and hereinafter referred to as "Petitioners"), by and through counsel, and respond to the "NRC Staff Answer Opposing Petition to Intervene and Request for Hearing" (hereinafter referred to "Staff Answer"), and to the "Nuclear Management Company's Answer to the August 8, 2005 Request for Hearing and Petition to Intervene" (hereinafter referred to as "NMC Answer"). Petitioner respond in opposition to those portions of the respective Answers which deny the admissibility of Petitioners' proffered contentions.

**ARGUMENT**

**Preliminary Note As To Standing Issues**

Nuclear Management Company raises no objections to the standing of the sundry Intervenors. NMC Answer p. 2. The Staff quibbles, not about the standing of the Intervenors, but only that the Organizational Intervenors have failed to demonstrate that they have

organizational standing. Staff Answer pp. 7-8. Because they are assured that some combination of their numbers has standing to raise the pending contentions, the Petitioners/Intervenors will make no further arguments on the standing issue, but instead will defer to the Board to render a final determination.

**Response as to Contention No. 1 (*The license renewal application is untimely and incomplete for failure to address the continuing crisis of embrittlement*)**

NMC and NRC staff have argued that Contention 1 regarding the Application's proposed management of the embrittlement of the Palisades reactor pressure vessel is inadmissible because the Contention (i) fails to challenge the Application and demonstrate the existence of a genuine dispute on a material issue of fact or law; (ii) fails to provide a factual basis to support any dispute with the application, and; (iii) improperly challenges Commission regulation. These assertions are incorrect.

**1) The embrittlement contention is within the scope of the proceeding**

The extended operation of the Palisades nuclear steam supply system falls squarely under 10 CFR § 54.21 and § 54.29(a) which focuses on the management of aging of certain systems, structures, and components and the review of time-limited aging evaluations.

A genuine dispute exists within the Application that is germane to the health and safety of the petitioners who live, work and recreate out to 50 miles from the Palisades nuclear power station in Covert, Michigan.

The Palisades Reactor Pressure Vessel is the subject component. There is no safety redundancy to this single largest component in the Palisades nuclear steam supply system. Palisades is arguably one of the most embrittled reactor pressure vessels, if not *the* most embrittled vessel, in the United States. The nuclear steam supply system for Palisades was the first of the Combustion Engineering line licensed for construction. Documentation as early as 1970 identifies

Surveillance specimens in the vessel will be used to monitor the radiation damage during the life of the plant. If these specimens reveal changes that affect the safety of the plant, the reactor vessel will be annealed to reduce radiation damage effects. The results of annealing will be confirmed by tests on additional surveillance specimens provide for this purpose. Prior to the accumulation of a peak fluence of  $10 \times 10^{19}$  nvt (>1 Mev) on the reactor vessel wall, the Regulatory Staff should reevaluate the continued suitability of the currently proposed startup, cool down, and operating conditions.<sup>1</sup>

Exhibit 1-A. All exhibits are found in "Petitioners' Appendix of Evidence in Support of Contentions" (Pet. App.), a copy of which is provided with this response in hard copy to the ASLB and the parties.

The Petitioners have been able to establish that the licensee could not provide surveillance materials for critical weld material in the Palisades vessel beltline welds in 1994.<sup>2</sup>  
See Exhibit 1-B.

A commitment was made for the Palisades plant as early as 1970 to make actual physical efforts by annealing the vessel to restore ductility should any "radiation damage" affecting plant safety be discovered. In fact, calculations later recognized by NRC staff concluded that the Palisades vessel could have surpassed its Pressure Thermal Shock ("PTS") limits as early as 1995. Repeated Palisades re-analyses have produced a widening range of resulting estimates for exceeding vessel embrittlement limits with a very broad range of uncertainty (as much as  $\pm 25\%$ ) with as many PTS values for the severely-embrittled reactor vessel. Palisades has neared the maximum-embrittlement goalposts time and again over the years,<sup>3</sup> but each time they have been moved back following rejiggering of the assumptions and

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<sup>1</sup>Report on Palisades Plant, Letter from Joseph Hendrie (ACRS) to Glen Seaborg, Chair AEC, January 27, 1970.

<sup>2</sup> Palisades Thermal Shock, NRC Staff Presentation to the ACRS, Viewgraphs, December 09, 1994, p. 3.

<sup>3</sup>"For example that is sort of a summary of the regulatory framework that applies to annealing. With regard to Palisades, we completed an evaluation in April of 1995 in which we concluded that they would reach the screening criteria. At least they were okay until 1999. That evaluation was consistent with the 50.61, the Pressurized Thermal Shock Rule. The current license for Palisades expires in 2007 so they would fall somewhat short of the current operating license with regard to the life of the vessel."

calculations. In 1995, for example, the NRC staff noted that the "Palisades RPV . . . is predicted to reach the PTS screening criteria by late 1999, before any other plant." NRC Generic Letter 92-01, Revision 1, Supplement 1: Reactor Vessel Structural Integrity (May 19, 1995) (Exhibit 1-J). The most recently-recognized estimates project that the current PTS criteria will be exceeded in 2014, which is early in the proposed 20-year license extension period.

The Applicant asserts that NRC approved methodology was used to perform neutron fluence calculations consistent with Regulatory Guide § 1.190 and described in WCAP-15353, "Palisades Reactor Pressure Vessel Fluence Evaluation." The Applicant argues that "at the appropriate time, prior to exceeding the PTS screening criteria, Palisades will select the optimum alternative to manage PTS in accordance with NRC regulations, and will make the applicable submittals to obtain NRC review and approval."<sup>4</sup> The Applicant argues that with respect to addressing technical issues relating to neutron irradiation embrittlement of the reactor pressure vessel that the Applicant adopts the third measure set forth in 10 CFR § 54.21(c)(1) to disposition the issue - *i.e.*, adequate management of the effects of neutron irradiation embrittlement - for the period of extended operation.

The content of technical information of an application is set forth in 10 CFR § 54.21 to include a review of systems, structures and components subject to an aging management review to include the reactor vessel, the core shroud and component supports. 10 CFR § 54.21(c)(1) stipulates an evaluation of time-limited aging analyses where the applicant must demonstrate (i) the analyses remain valid for the period of extended operation; (ii) the analyses

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"Briefing on Annealing Demonstration Project," NRC Public Meeting, August 27, 1996.

<sup>4</sup>"Application for Renewed Operating License for Palisades Nuclear Generating Station," Nuclear Management Company, March 22, 2005, ADAMS Accession Number ML050940446, p. 4-15.

have been projected to the end of the period of extended operation; (iii) the effects of aging on the intended function(s) will be adequately managed for the period of operation.

Under the current rule (10 CFR § 50.61), three courses of action can be taken to manage aging of the reactor vessel: 1) The operator shall implement flux reduction programs that are reasonably practicable to avoid exceeding the PTS screening criteria;

2) For those plants where no “reasonable flux reduction program will prevent RTpts from exceeding the PTS screening criterion” the operator can take a look at plant-specific evaluation of plant systems, thermal hydraulics, reactor vessel design, etc. This analysis must be submitted at least three years before RTpts is projected to exceed the PTS screening criteria; or;

3) Anneal the pressure vessel as provided under 10 CFR § 50.66, or the annealing rule and Regulatory Guide § 1.162, which provides guidance on how to implement the annealing rule.

There is a requirement that a licensee that desires to anneal the reactor vessel must submit a thermal annealing report 3 years before actually performing the annealing. This thermal report has four major sections in it. One is an operating plan basically identifying how annealing is to be performed.

The Petitioners do not agree that the current rule necessarily affords an either/or choice to be made by the company, as with choosing from a Whitman’s Sampler box of candy, but rather, that it contemplates a combination of efforts in concert to achieve the largest margins of safety. The Petitioners further suggest that the operative words in 10 CFR § 50.61(b)(4) [where there is “no reasonably practicable flux reduction program” to prevent exceeding the PTS criteria] require, not only consideration of the financial interests of the utility, but that the

regulation is heavily weighted in the direction of considering public safety. Hence the

Petitioners dispute licensee's assertion in the Application ( page 4-10) that:

The flux to the reactor vessel would have to be reduced by an additional factor of 3 in order to reach March 24, 2031. Some additional flux reduction could conceivably be achieved by installation of additional shield assemblies and/or flux suppression devices (e.g. hafnium inserts). Flux reduction of the magnitude required at Palisades would require far more extraordinary measures, such as the installation of neutron shields on the exterior of the core support barrel. *It is unlikely that a plant modification of this magnitude would be cost-effective.* (Emphasis added)

It is highly likely that NMC would pursue alternative solutions rather than rely on flux reduction to extend the reactor vessel life. Other alternatives that would be considered would include completion of the safety analysis as specified in 10 CFR § 50.61 (b)(4), and thermal annealing treatment as specified in 10 CFR § 50.61(b)(7). Any alternative that NMC may propose in the future to extend the life of the Palisades reactor vessel would, of necessity, be discussed thoroughly with the NRC and would be subject to formal NRC review and approval before it could be implemented. The ultimate method used to manage PTS for extended plant operation would be governed by NRC regulations independently from the license renewal process.”<sup>5</sup>

The Petitioners also dispute that part of the Application where the licensee states (p. 4-15) in its Analysis that “The current pressure/temperature analyses are valid beyond the current operating license period, but not to the end of the period of extended operation. These analyses are estimated to expire in 2014.”<sup>6</sup> The licensee admits in its Application that it seeks to limit an aging management strategy as required in 10 CFR § 54.21(c)(1)(iii) and adopt a subset of the established management strategies as established by 10 CFR § 50.61 for fracture toughness requirements to protect against pressurized thermal shock events based on

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<sup>5</sup> *Id.*, p. 4-10.

<sup>6</sup> *Id.*, p. 4-15.

economic considerations to the licensee. It does so, however, without adequately demonstrating that the proposed alternatives can confidently address and mitigate advancing embrittlement and the associated higher Pressure Thermal Shock values any better than the licensee's admitted inability to reduce, cost-effectively, an increasing safety-significant risk to the public through flux reduction programs. Petitioners argue that all of these management strategies are in place to provide reasonable assurance that the public health and safety will be protected, first and foremost, and that they are not mere options to be predicated on consideration of the company's financial bottom line.

Petitioners submit that an effective and reliable management plan for a twenty-year extension must begin with the incorporation of all NRC management strategies as outlined under 10 CFR § 50.61, including fluence reduction efforts, not just the company's perceived cost-effective ones. This is particularly germane to Palisades, as the NRC staff has recognized through a broad set of calculations and associated uncertainties in determining the actual severity of the embrittlement that the vessel might have exceeded the PTS criterion as early as 1995 or might, according to later questionable estimations, exceed as late as 2014. That would be three (3) years into the 20-year license extension period sought by NMC.

The Applicant has already abandoned a previous commitment to anneal the severely embrittled Palisades pressure vessel, discussed *infra*. Petitioners are unsure whether the Applicant abandoned its previous commitment to anneal the Palisades reactor pressure vessel because of economic considerations, or because of operational issues and risks associated with re-embrittlement of annealed beltline welds. NMC instead now relies on a complex re-analysis to assure safety margins in the physically-deteriorating reactor pressure vessel. The requisite labyrinth of computer models that has resulted has been subjected to much healthy skepticism from the NRC's own Advisory Committee on Reactor Safeguards.

In light of these problems, petitioners suggest that it is unreasonable for the Applicant to forego Flux Reduction programs for the extension period which might reasonably reduce the risk to public health and safety from a Pressure Thermal Shock accident potentially occurring during the same license extension period without demonstrating with a high degree of confidence that alternative approaches, *including* the option of annealing the vessel, can adequately preserve required public safety margins in the extension period.

Instead, the Application seeks less costly and undemonstrated efforts for the extension period by vaguely proposing to alternately;

1) incorporate another embrittlement and PTS re-analysis which is recognized by significant uncertainties that potentially seek to merely pencil whip a worsening safety issue with narrowing safety margins for the proposed extension period or;

2) resort to a yet-to-be demonstrated effective annealing of the reactor pressure vessel, a process which the same operator had already previously committed to in 1995 and abandoned in 1997.

The applicant's statement that it can abandon actual physical and operational measures to reduce the neutron fluence affecting embrittlement of the pressure vessel raises an undue public risk from a Pressure Thermal Shock event.

Therefore, the Petitioners suggest that under current established management strategy Palisades may have already exceeded the current PTS criteria or if not, will exceed the criteria early in the proposed license renewal period (*viz.*, 2014). It is therefore unreasonable and unacceptable for the Application to foreclose options within its established management strategy for economic reasons without first being required to demonstrate with confidence that the proposed alternatives adequately provide for the public's protection from this significant ongoing and potentially worsening age-associated safety issue.

Petitioners are particularly concerned that safety focused measures such as Flux Reduction Programs at Palisades fall victim to the economic imperative to keep the reactor operating even at unacceptably reduced margins of safety rather than make much-needed investments.

This controversy is an historical problem at Palisades. The New York Times reported April 12, 1992 on a comment by then-NRC Chairman Ivan Selin on the vulnerability of Palisades to early closure because of embrittlement:

Mr. Selin said it was unlikely that any utility would decide to close a plant that was running smoothly and was not in immediate need of any big investment. But if a plant required a large investment, he said, 'that could push it over the brink.' In that category he put the Consumers Power Company's Palisades plant, near South Haven, Mich., which opened in 1971, where the reactor pressure vessel may now be brittle, the same weakness that was suspected at Yankee Rowe. . . .<sup>7</sup>

Exhibit 1-C.

There is a grave issue of law here: whether the economically-dictated priorities of Palisades, or the health and safety concerns of the Petitioners, conform to NRC regulations. A Licensing Board should not address the merits of a contention when determining its admissibility. *Carolina Power and Light Co. and North Carolina Eastern Municipal Power Agency* (Shearon Harris Nuclear Power Plant), ALAB-837, 23 NRC 525, 541 (1986); *Texas Utilities Electric Co.* (Comanche Peak Steam Electric Station, Unit 1), ALAB-868, 25 NRC 912, 933 (1987); What is required is that an intervenor state the reasons for its concern. *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542 (1980).

The Petitioners have stated reasons for their concern. The Board should conclude that the Application is deficient and should be rejected.

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<sup>7</sup> "Cheap and Abundant Power May Shutter Some Reactors," Matt Wald, New York Times, April 14, 1992.

## **2) There are many factual disputes affecting public health and safety**

Palisades Nuclear Power Station is a Combustion Engineering Pressurized Water Reactor identified as one of the earlier reactor vessels of greater concern whose current 40-year license expires in 2011 after being granted a four-year recapture period.

As NIRS has pointed out in its earlier publication, "The Aging of Nuclear Power Plants, A Citizen's Guide to Causes and Effects":

Irradiation embrittlement of the reactor pressure vessel (RPV) may be the single most important factor in determining the operating life of a Pressurized Water Reactor. The design of pressure vessels is generally the same for all PWRs generally constructed from 8 inch thick steel plates, formed and welded to create the vessel structure.

The major age-related mechanism associated with this component is embrittlement. Embrittlement is the loss of ductility, i.e, the ability of the pressure vessel metals to withstand stress without cracking. It is caused by neutron bombardment of the vessel metal and is contingent upon the amount of copper and nickel in the metal and the extent of neutron exposure or fluence. As the metal in the reactor pressure vessel is bombarded with radiation, high-energy atomic particles pass through the steel wall. In doing so, these atoms collide with atoms in the metal and knock them out of position. Over time this results in the loss of ductility.

In an unirradiated vessel the metal loses its ductility at about 40 degrees Fahrenheit. As the vessel becomes embrittled, the temperature at which it loses its ductility rises. This change in the mechanical properties of the metal from ductile to brittle is characterized as the 'reference temperature for nil ductility transition' or RTndt. Thus as the reactor ages and the pressure vessel is exposed to more radiation, the RTndt can shift from its original 40 degree F to as much as 280-290 degrees F or more in extreme cases.<sup>8</sup>

From Exhibit 1-D.

The embrittlement of the all-important reactor pressure vessel, which has no redundant safety feature in a nuclear power station, is of even greater concern to those plants constructed prior to 1972. Palisades was issued its construction license in 1967. According to thermal shock experts within Electric Power Research Institute (EPRI), there is an

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<sup>8</sup> The Aging of Nuclear Power Plants: A Citizen's Guide to Causes and Effects, Nuclear Information and Resource Service, 1988, Chapter IV, "Embrittlement of Reactor Pressure Vessels and Reactor Pressure Vessel Supports in Pressurized Water Reactors," p. 19.

indeterminate amount of susceptible copper in the metal walls of these older vessels and in the weld material used to join the vessel plates.

The significance of embrittlement of the vessel component and the shift in  $RT_{ndt}$  is the increased susceptibility to pressurized thermal shock (PTS). Pressurized thermal shock occurs when the reactor pressure vessel is severely overcooled. RPV technical specifications generally limit the cool down to a rate of  $100^{\circ}$  F per hour. During an overcooling event (*i.e.*, pipe break) the vessel may experience a drop in temperature of several hundred degrees per hour. This extreme drop in temperature can send a thermal shock through the vessel wall. As the vessel is overcooled there is a drop in the pressure of the primary coolant loop. This rapid decrease in the pressure of primary coolant cause the high pressure injection pumps in the Emergency Core Cooling System to automatically inject coolant into the primary loop. As the injection of coolant repressurizes the RPV, the vessel is subject to pressure stresses. The stresses placed on the RPV by overcooling and repressurization cause the Pressure Thermal Shock.

Pressure Thermal Shock can be initiated by numerous accidents, including: control system malfunctions, small, medium and large break loss of coolant accidents including main steam line break, feed water pipe break, and steam generator tube ruptures. Any of these events can initiate a PTS event, but as long as the fracture resistance of the reactor pressure vessel material and welds remains high, *i.e.*,  $RT_{ndt}$  values remain low, such transients are considered unlikely to cause vessel failure. However, the reduction of fracture resistance within the RPV wall and weld materials, severe overcooling accompanied by repressurization can cause pre-existing flaws in the inner surface of the RPV to propagate into cracks which can go through the vessel wall resulting in the associated uncontrollable loss of coolant water over the reactor core.

For failure of the RPV to occur a number of factors must be present:

1) the vessel must have a flaw of sufficient size to propagate and a typical vessel can have thousands of varied-sized flaws;

2) the vessel material must be susceptible to irradiation embrittlement due to copper and nickel content;

3) the vessel must be sufficiently irradiated to cause a decrease in ductility , represented by an increase in the RTndt value;

4) an event must initiate a severe overcooling transient with repressurization;

5) the resulting crack must be of such size and location that the RPV's ability to maintain core cooling is affected.

Petitioners believe it more likely than not that some or all of these factors are present at Palisades, as they articulate below. Petitioners believe they have provided quite sufficient information to establish the existence of a genuine dispute with the applicant on a material issue of law or fact, as required by 10 CFR § 2.309(f)(1)(v) (formerly § 2.714(b)(2)(iii)). See Georgia Power Co. (Vogle Electric Generating Plant, Units 1 and 2), LBP-9121, 33 NRC 419, 422-24 (1991), appeal dismissed, CLI-92-3, 35 NRC 63 (1992); Arizona Public Service Co. (Palo Verde Nuclear Generating Station, Units 1, 2 and 3), CLI-91-12, 34 NRC 149, 155-56 (1991); Duke Energy Corp. (McGuire Nuclear Station, Units 1 and 2; Catawba Nuclear Station, Units 1 and 2), LBP-02-4, 55 NRC 49, 64-68 (2002).

A. Significant flaws are likely to exist on the surface of the Palisades reactor pressure vessel wall and considerable uncertainty exists to dispute assumptions with regard to the extent that these flaws can contribute to making PTS events increasingly risk-significant.

The Petitioners have significant safety-related concerns with regard to the uncertainty that exists with the analyzed flaw distribution in the Palisades reactor pressure vessel. As documented in transcripts as recent as 2004, the NRC's Advisory Committee on Reactor

Safeguards shares in those concerns and disputed flaw distribution assumptions:

Dr. Wallis [ACRS]: This flaw distribution is based on rather skimpy evidence. This is one of the areas where---I mean, heat transfer Dittus-Boelter if you believe that. It's based on data points. But the flow [sic "flaw"] distribution in these walls is based on a few examinations. Isn't it?

Mr Ericksonkirk [NRC RES]: A few examinations but infinitely more than we had the first time.

Dr. Wallis: It's much better than you had the first time.

Mr. Ericksonkirk: Much better than we had the first time. I think as a laboratory geek at heart I have to admit I would really like to have more data on this and I don't think there's anybody in the technical community that would disagree with this. But I think that it's also important to recognize that the flaw distribution doesn't rest on experimental evidence alone. Certainly we started with — excuse me. We start with experimental evidence both from destructive and nondestructive evaluations but that's then also bolstered by --

Dr. Wallis: But those are individual reactors' vessels.

Mr. Ericksonkirk: That's right.

Dr. Wallis: But there are a hundred reactor vessels. I don't know how convincing it is that the flaw distribution that you might measure in a couple of vessels which were taken apart is typical of all other vessels.

Mr. Ericksonkirk: No. I think it would be unfair to say that a single experimental distribution derived from two vessels could be just looked at and thought to be representative of the other vessels.<sup>9</sup>

Excerpted from Exhibit 1-E.

B. The Petitioners urge that Palisades reactor pressure vessel is susceptible to irradiation embrittlement due at least to its copper/nickel/phosphorus content and dispute assumptions that regard the viability of reactor vessel sampling of susceptible materials and the associated RTndt /RTpts assumptions specific to Palisades reactor pressure vessel.

Palisades does not have representative samples of susceptible materials for surveillance requirements of its reactor pressure vessel, including the weld material in the

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<sup>9</sup> Official Transcript of NRC Proceeding, ACRS Joint Subcommittees: Materials and Metallurgy Thermal Hydraulic Phenomenon Reliability and Probablistic Risk Assessment Meeting, December 01, 2004, p. 15 line 17 – p. 16, line 25.

vulnerable beltline welds. Palisades' assumptions on the material contaminants in the vessel and weld materials are based on questionable extrapolations of generic industry data and materials taken from weld material in Palisades' discarded steam generator which arguably did not experience the same level of adverse operational conditions as those degrading the reactor vessel beltline welds.

Further, adequate analysis of the Palisades beltline welds has been problematic due to uncertainties in determining the copper, nickel and phosphorous content of the susceptible materials. In 1994, NRC staff at one point clashed with ABB Combustion Engineering staff who had refused to divulge data on reactor vessel weld integrity that the vendor on proprietary grounds that the company wanted to keep confidential. NRC said that it might need to compel CE to release the data.<sup>10</sup> Exhibit 1-F.

C. Petitioners dispute the viability of NMC assumptions regarding the degree to which Palisades pressure vessel materials have been degraded due to radiation-induced embrittlement and suggest that significant uncertainty exists with regard to the degraded state of the vessel, represented by an increase in its RTndt and RTpts values, for them to be accurately used as a reference point for an additional twenty-year extension.

The Applicant has over the years set forth many re-evaluations of the Palisades Rtn dt and RTpts values with a wide range of findings and uncertainty as to bring into question the viability of the degree of embrittlement of the Palisades reactor pressure vessel in its current condition to withstand a PTS event. The petitioners dispute the Applicants' claim that "The current pressure/temperature analyses are valid beyond the current operating license period, but not to the end of the period of extended operation. These analyses are estimated to expire in 2014."<sup>11</sup>

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<sup>10</sup> Palisades Could Reach Its PTS Screening Limit Earlier Than Expected," Inside NRC, December 12, 1994, p. 13.

<sup>11</sup> Palisades Application, p. 4-15

Petitioners are aware of NRC communications which raise **this** dispute with regard to the NMC assertions that they do not exceed PTS screening criteria until 2014:

*From: Stephanie Coffin  
To: Hoffman, Stephen  
Date: 11/24/04 3:05PM  
Subject: Palisades phone call*

*We had a phone call with them Monday.*

*They no longer plan on submitting an exemption to apply "Master Curve" at their facility. Instead, they will be managing it in accordance with the May 27, 2004 guidance from Reyes to the Commissioners. They are following Point Beach and Beaver Valley closely.*

*I gave them feedback especially about the flux reduction requirements of the current rule and suggested they review the Point Beach submittal and our associated SER with Open Items, and to check for applicability to their plant.*

*FYI for Matt and Barry and Neil:*

*If they see that the new PTS rule will not be published in time for them (they currently exceed the screening criteria in 2014 - I don't know if we agree with that), they will submit the Master Curve exemption in 2007.*

*Stephanie*

*CC: Duvigneaud, Dylanne; Elliot, Barry; Mitchell, Matthew; Ray, Nihar; Stang, John<sup>12</sup>*

Exhibit 1-G. Petitioners contend that at best, whether or not Palisades has exceeded its RTpts remains inconclusive and at worst RTpts were exceeded as early as 1995 or 2001. As such, the petitioners dispute that the licensee has established an accurate and reliable reference temperature point for Palisades pressure vessel RTndt and RTpts values as a basis for extending Palisades operations for an additional 20-year period.

D. The petitioners contend that a significant dispute exists with regard to NMC assumptions on the low probability of an event to initiate a severe overcooling transient with repressurization such that the resulting crack will be of such size and location as to make the probability of a significant Palisades vessel fracture acceptably small

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<sup>12</sup>Notes from NRC Telephone Call, "Palisades phone call," 11/24/2004, ML043340206.

NMC relies heavily upon assumptions that the probability of an initiating event is acceptably small, as do other pressurized water reactor operators. Given the associated uncertainty with the actual degradation of the Palisades reactor pressure vessel, the Petitioners submit that to take any comfort that the “big one” is not going to occur is uncomfortably reminiscent of the lack of an effective governmental response to the inadequate levees around New Orleans based on the improbability of conditions leading to the Gulf Coast city encountering a hurricane greater than Category III.

This type of accident is beyond the design basis of Palisades Nuclear Power Station, namely its safety systems, including the emergency core cooling system and the containment, which are not designed to withstand cracks in the pressure vessel resulting in the inability to sufficiently cool the reactor core and reactor core damage.

**3) The petitioners dispute the Applicant’s assertion that it can optionally anneal the embrittled vessel, given the lack of a demonstrated effective annealing process for any irradiated commercial reactor pressure vessels and the applicant’s abandonment of a prior commitment for annealing the Palisades reactor pressure vessel that make the abandonment of Flux Reduction efforts for economic considerations unreasonable**

Annealing, while a routine process in metallurgy, is acknowledged to be complicated by reactor pressure vessel radioactivity. For Palisades it would involve heating the beltline weld and perhaps the axial welds or some vessel plates to about 850° F for approximately a week or more. Even then, early estimates as to how long an annealing repair will last is a matter of debate and depend on a number of factors. Alan Hiser, U.S. Nuclear Regulatory Commission was attributed to say “If the material is a weld, rather than a plate, the annealing repair will be less effective and the re-embrittlement faster. The chemistry of the material is crucial, as well --

steels or welds containing nickel or copper are more subject to embrittlement and re-embrittlement.”<sup>13</sup> Exhibit 1-H.

Palisades has previously announced plans to anneal the reactor pressure vessel but has taken no action. On January 5, 1995, Consumers Power Company informed its employees that the Palisades reactor would reach its PTS screening criteria limit as early as 1996. Consumers Power then announced plans to anneal the Palisades vessel by the year 2000.<sup>14</sup>

Palisades operators met with the NRC Commission Chairman on May 11, 1995 regarding its planned annealing operation.<sup>15</sup>

While the Applicant refers to annealing of the pressure vessel to mitigate the severely embrittled component as an option it can take up at the “appropriate time,” in fact, the Applicant withdrew its original request for further NRC staff review of its Preliminary Thermal Annealing Report as the company disclosed that it no longer had plans to anneal the embrittled vessel in 1998.<sup>16</sup>

NRC and the nuclear industry had an opportunity to test the annealing process on the irradiated decommissioned Yankee Rowe nuclear reactor pressure vessel but took no such action, instead Yankee Atomic Corporation used the badly embrittled vessel as a nuclear waste container for burial in Barnwell, South Carolina. While the NRC and industry have referred to the Yankee Atomic vessel as atypical of other commercial vessels, a valuable opportunity to test the annealing process on an irradiated specimen was a lost opportunity for

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<sup>13</sup> Outlook for Life Extension, Special Report to the Readers of Nucleonics Week, Inside NRC and NuclearFuel,” April 11, 1991 p. 10.

<sup>14</sup> "Consumers May Anneal Palisades' Vessel-A U.S. First," Nucleonics Week, January 12, 1995, p. 1.

<sup>15</sup> Meeting Summary between the Chairman and Consumers Power Co., US NRC, Microfiche Address 84015:231- 84015:231.

<sup>16</sup> Consumers Energy Co. (formerly Consumers Power Co.) Withdraws Request for Further Staff Review of Preliminary Thermal Annealing Report, April 24, 1997, US NRC PDR, Microform Addresses: 92745:358-92745:359.

the entire industry. As a result, there is no experience with annealing severely-embrittled commercial power reactors in the United States which, coupled with the Applicant's abandonment of Flux Reduction Programs and the unreliability of the Applicant's past safety analysis, renders the Application deficient and deserving of rejection.

***4) The Petitioners argue that Contention 1 on the Palisades embrittlement and PTS issue is not an improperly challenge to Commission rulings***

The Petitioners have valid and proper concerns regarding consistent, thorough and viable analysis and documentation of Pressure Thermal Shock values calculated by both the industry and the NRC for Palisades, which is arguably one of the most embrittled reactors in the United States. Since 1981, the Palisades pressure vessel has been at the forefront of the embrittlement controversy and associated safety concerns for a Pressure Thermal Shock accident.

The Palisades nuclear power station pressure vessel has been analyzed and re-analyzed by NRC and projected to exceed its Pressure Thermal Shock Screening Criteria in numerous time frames:

> April 03, 1989, Consumers Power provided a revised report on reactor vessel fluence for operational cycles 1 through 8 in association with its vessel fluence reduction report. "It concludes that the PTS screening criteria will be exceeded at the axial welds in September 2001 as opposed to the previously reported exceed date of March 2002."<sup>17</sup> Exhibit 1-I.

Consumers Power Company (Now CMS) acknowledges a calculational uncertainty of + / - 25% in estimating the calculated vessel wall fluence, this is said to be typical of current neutron transport methodology uncertainties. Consumers reported:

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<sup>17</sup> Compliance with Pressurized Thermal Shock Regulation 10CFR50.61 and Regulatory Guide 1.99 Revision 2 (TAC No. 59970), Consumers Power, May 17, 1990, p. 1.

A number of factors contribute to the uncertainty in the projected peak fast fluence at the reactor vessel wall. These factors are due to the conversion of measured activity data to fluxes, uncertainties in material composition, neutron cross sections, power distributions, as-built core/vessel dimensions and cycle-by-cycle variation in the fast flux lead factors.<sup>18</sup>

> In the October 28, 1994 revision of NRC's "Status of Reactor Pressure Vessel Issues" (SECY 94-267) reports the staff indicated that the Palisades Pressure Vessel would reach the pressurized thermal shock (PTS) screening criteria in the year 2004.<sup>19</sup>

> In a revision in November 1994, NRC staff reported that:

[T]he staff was informed of preliminary data from the retired steam generators that indicates the Palisades reactor pressure vessel could reach the PTS screening criteria earlier than 2004. The licensee is continuing to evaluate the new data and to gather additional materials properties from its retired steam generators. If the preliminary data are confirmed, the plant would reach the PTS screen criteria at the next outage in May 1995.<sup>20</sup>

> On January 24, 1995 in a NRC meeting on "Materials Issues in Palisades PTS Evaluation," the Palisades PTS criteria is again referenced and revised in staff view graphs stating: "*November 1, 1994, licensee informed staff that data from SG [steam generators] welds - Indicated higher copper contents than previously assumed - Indicated higher RTndt than mean generic value- Licensee assessment indicated reaching PTS screening criteria in 1999.*"<sup>21</sup>

> On November 24, 2004, a documented NRC telephone conversation further enlightens the ongoing uncertainty and inconsistency of estimating a still elusive timetable for exceeding the public safety-related criteria:

*From: Stephanie Coffin*

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<sup>18</sup> *Id.*, p. 33.

<sup>19</sup> "Status of Reactor Pressure Vessel Issues," SECY-94-267, US NRC, October 28, 1994 (Exhibit 1-K).

<sup>20</sup> "Items of Interest," Office of Nuclear Reactor Regulation, Week Ending November 04, 1994 (Exhibit 1-L)..

<sup>21</sup> "Materials Issues in Palisades PTS Evaluation," Presented to NSRRC Subcommittee on Materials and Engineering, US NRC, January 24, 1995 (Exhibit 1-M).

*To: Hoffman, Stephen  
Date: 11/24/04 3:05PM  
Subject: Palisades phone call*

*We had a phone call with them Monday.*

*They no longer plan on submitting an exemption to apply "Master Curve" at their facility. Instead, they will be managing it in accordance with the May 27, 2004 guidance from Reyes to the Commissioners. They are following Point Beach and Beaver Valley closely.*

*I gave them feedback especially about the flux reduction requirements of the current rule and suggested they review the Point Beach submittal and our associated SER with Open Items, and to check for applicability to their plant.*

*FYI for Matt and Barry and Neil:*

*If they see that the new PTS rule will not be published in time for them (they currently exceed the screening criteria in 2014 - I don't know if we agree with that), they will submit the Master Curve exemption in 2007.*

*Stephanie*

*CC: Duvigneaud, Dylanne; Elliot, Barry; Mitchell, Matthew; Ray, Nihar; Stang, John"<sup>22</sup>*

[The petitioners note that the referenced May 27, 2004 communication from Reyes to the Commissioners regarding Palisades management plan is not available to the public through NRC ADAMS.]

Palisades values for exceeding the PTS criteria have been extremely fluid, back and forth, with significant disparity in the year that the criteria is exceeded. The lack of consistent reliable analyses of the rate and level of embrittlement, complicated by the lack of viable Palisades-specific in-vessel sampling materials, together with dependence on generic industry data, demonstrate the unreliability of data used to establish Palisades' compliance with the screening criteria and subsequent effective mitigation actions for the license extension period.

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<sup>22</sup> Notes from NRC Telephone Call, "Palisades phone call," 11/24/2004, ML043340206, Exhibit 1-G.

This contention arises from evidence contained within the NRC's Staff contacts with the affected utility. The bases for a contention need not originate with the petitioner. Petitioners here properly may base their contention on NRC Staff letters to an applicant, so long as there is an adequate explanation of how alleged deficiencies support its contention and that there is additional information in support. *Louisiana Energy Services L.P.* (Claiborne Enrichment Center), LBP-91-41, 34 NRC 332, 338-339 (1991). See *Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), LBP-92-23, 36 NRC 120, 136 (1992), appeal granted in part and remanded, CLI-93-3, 37 NRC 135 (1993).

**5) The significant uncertainty represents a dispute of fact that undermines confidence in Palisades treatment of PTS values for the License Renewal Process**

The Palisades nuclear power station one of four U.S. reactor sites participating in the development of models for developing the technical basis for the revision of the PTS Rule. A review of transcripts of the Advisory Committee on Reactor Safeguards Joint Subcommittees Materials and Metallurgy and Thermal Hydraulic Phenomena and Reliability and Probabilistic Risk Assessment reveals substantial and significant uncertainties with regard to capturing and bounding public safety risk associated with ongoing operations further complicated by the twenty year license extension in three major technical areas: probabilistic fracture mechanics, thermal hydraulics and probabilistic risk assessment.

NRC staff went to the ACRS in November 2004, seeking a letter of endorsement of the staff effort to revise the current PTS rule. The revised PTS screening criteria is incomplete and fraught with uncertainty. According to the NRC Advisory Committee on Reactor Safeguards, in

its Conclusions and Recommendations on NUREG-1809 “Thermal-Hydraulic Evaluation of Pressure Thermal Shock “should be substantially revised.”<sup>23</sup>

There are numerous citations in the ACRS transcripts that underscore the uncertainty that prompted the ACRS’ call for the substantial revision of the technical basis for on Thermal-Hydraulic Evaluation of Pressure Thermal Shock.

**5) There is a lack of transparency and an incomplete record of NRC processes and documents which potentially affect the Palisades License Renewal Process with regard to how the Revision of the PTS Rule may affect the outcome of the Application**

The NRC has not provided sufficient transparency and completeness of the public record germane to the processes with potential implications for the Palisades license extension. The Petitioners are not able to thoroughly review current NRC efforts to revise its Pressure Thermal Shock Rule. NRC has not made all of its germane safety documentation, albeit draft documents, available for public review. Two key examples are:

1) “Technical Basis for Revision of Pressurized Thermal Shock (PTS) Screening Limit in the PTS Rule (10 CFR 50.61): Summary Report,” NUREG-1806, Draft for Peer Review Panel and ACRS Review, November 2, 2004; and

2) “Thermal Hydraulic Evaluation of Pressurized Thermal Shock,” NUREG- 1809, Draft, February, 2005.

Whether or not a basis for contentions has been established must be decided by considering the contentions in the context of the entire record of the case up to the time the contentions are filed. Thus, when an application for a license amendment is itself incomplete,

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<sup>23</sup> Pressure Thermal Shock (PTS) Evaluation Project: Technical Basis for Revision of the PTS Screening Criterion in the PTS Rule,” March 11, 2005, Graham Wallis, Chairman, Advisory Committee on Reactor Safeguards, US NRC, p. 1., NRC ADAMS ML 050730177.

the standard for the admission of contentions is lowered, because it is easier for petitioners to have reasons for believing that the application has not demonstrated the safety of the proposed procedures for which an amendment is sought. *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Units 1 and 2), LBP-81-45, 14 NRC 853 (1981). Petitioners urge that this contention should be deemed admissible at a lower standard precisely because there is undisclosed information which can be explored adequately for its relevance to the Application at a hearing.

With respect to their Contention No. 1, Petitioners have demonstrated many factual conundrums which must be resolved by means of a merit hearing. All that is required for a contention to be acceptable for litigation is that it be specific and have a basis. Whether or not the contention is true is left to litigation on the merits in the licensing proceeding. *Washington Public Power Supply System* (WPPSS Nuclear Project No. 2), ALAB-722, 17 NRC 546, 551 n.5 (1983), citing *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542 (1980); *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-806, 21 NRC 1183, 1193 n.39 (1985); *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 NRC 681, 694 (1985). The factual support necessary to show that a genuine dispute exists need not be in formal evidentiary form, nor be as strong as that necessary to withstand a summary disposition motion. What is required is "a minimal showing that material facts are in dispute, thereby demonstrating that an 'inquiry in depth' is appropriate." *Gulf States Utilities Co.* (River Bend Station, Unit 1), CLI-94-10, 40 NRC 43, 51 (1994) (citing Final Rule, Rules of Practice for Domestic Licensing Proceedings -- Procedural Changes in the Hearing Process, 54 Fed. Reg. 33,168, 33,171 (Aug. 11, 1989), quoting *Connecticut Bankers Association v. Board of Governors*, 627 F.2d 245 (D.C. Cir. 1980).

***Response as to Contention No. 2 (Excessive radioactive and toxic chemical contamination in local drinking water due to emissions from Palisades nuclear power plant as part of its daily, "routine" operations)***

NMC states (Answer p. 14) that this contention "is inadmissible because (i) the substance of the assertions (alleged radioactive and chemical emissions from the plant) are outside the scope of this proceeding, and (ii) the assertions are vague and unsupported by factual basis." The Staff likewise challenges (Staff Answer p. 14) this contention as "...vague and lacking in the required supporting information. . . ." The NRC goes on to state (Answer p. 14) that Petitioners failed "to provide the specific factual information necessary to provide a valid basis for any safety claim. . . ." Petitioners provide considerable information below, but it should be noted that the NRC has had in its possession these very documents for years, even decades. NRC staff also challenges this contention as being "generalized and unsupported arguments," but the information supplied below turns away that assertion. The NRC staff's failures to address these concerns is a violation of the agency's own mandate and mission to protect public health and safety and the environment.

NMC says (Answer p. 15) that "radioactive and chemical emissions from the plant are not issues related to the management of aging or time-limited aging analyses." On the contrary, such emissions are age-related, in that deteriorating and degrading reactor systems, including the Palisades reactor's fuel rods, pipes, tanks, and valves, will increase the amounts of toxic chemicals and radioactivity released into the Lake Michigan ecosystem over time due to increased leaks and malfunctions. Not only do "routine" releases thus increase, but so does the risk of more severe incidents and accidents as the reactor ages.

NMC (Answer p. 15) seeks to dismiss the validity of this contention by stating "[r]adiation exposure to the public during the renewal term is a Category 1 issue determined to

be small, based on a generic finding that radiation doses to the public will continue at current levels associated with normal operations.” However, as stated above, releases of toxic chemicals and radioactivity over time can be expected to increase due to more leakage and malfunctioning of age-deteriorated and degraded equipment and systems. In addition, the recent report published by the National Academies of Science (NAS) Committee on the Biological Effects of Ionizing Radiation (BEIR VII, published June 2005 and entitled “Health Effects from Exposure to Low Levels of Ionizing Radiation”) found that exposure to even low levels of ionizing radiation has a negative impact on human health. See <http://www.nap.edu/books/030909156X/html>. The significance of the NAS BEIR VII Report’s findings and relevance to ascertaining the implications of 20 more years of radioactivity emissions from Palisades is unmistakable. The NRC’s previous conclusion that the impact to public health is minimal or trivial must be re-evaluated in light of the recently published NAS BEIR VII report.

NMC urges that the contention is “inadmissible because it is vague and unsupported by any factual basis, ” that it “fails to identify what toxic and radioactive substances allegedly are released during the plant’s ‘routine’ operations, and in what respect any such emissions are allegedly ‘excessive.’ “ Specifically, the radioactive releases from the Palisades nuclear power plant into the environment of the Great Lakes Basin that are of most concern include radioactive hydrogen (tritium), radioactive noble gases (such as xenon and krypton, which relatively quickly transform into biologically active radioactive substances such as cesium and strontium), as well as fission products, activation products, and transuranics that find their way into the environment after escaping the reactor or the irradiated fuel.

Documentation recording such releases at Palisades includes the “Radioactive Materials Released from Nuclear Power Plants,” NUREG/CR-2907, BNL-NUREG-51581, Vol.

14, Annual Report 1993, prepared by J. Tichler, K. Doty, and K. Lucadamo, Brookhaven National Laboratory, prepared for the U.S. Nuclear Regulatory Commission, covering the years 1974 to 1993, and documenting reported annual emissions of such liquid and airborne effluents from Palisades as tritium, mixed fission and activation products. See Exhibit 2-A.

The following figures were reported for emissions from the Palisades Nuclear Power Plant:

From Table 2, pages 8 to 10

Airborne Effluents Comparison By Year/Fission and Activation Gases (Total Curies)

1974: <1.00E+00  
1975: 2.61E+03  
1976: 2.99E+01  
1977: 5.99E+01  
1978: 3.23E+02  
1979: 6.84E+01  
1980: 1.40E+02  
1981: 3.00E+03  
1982: 7.38E+03  
1983: 3.00E+03  
1984: 2.84E+01  
1985: 3.68E+03  
1986: 1.73E+02  
1987: 1.75E+03  
1988: 2.43E+03  
1989: 1.52E+02  
1990: 1.21E+02  
1991: 6.26E+01  
1992: 7.46E+01  
1993: 9.29E+01

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From Table 6, pages 20 to 22

Liquid Effluents, Comparison By Year/Tritium (Curies)

1974: 8.10E+00  
1975: 4.16E+01  
1976: 9.63E+00  
1977: 5.58E+01  
1978: 1.01E+02  
1979: 1.26E+02  
1980: 7.47E+01  
1981: 2.78E+02  
1982: 1.79E+02  
1983: 2.35E+02  
1984: 6.95E+01  
1985: 4.29E+02  
1986: 6.32E+01  
1987: 1.19E+02  
1988: 2.83E+02  
1989: 8.06E+01  
1990: 1.49E+02  
1991: 5.52E+01  
1992: 8.09E+01  
1993: 2.10E+02

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From Table 8, pages 26 to 28

Liquid Effluents, Comparison By Year/Mixed Fission and Activation Products (Curies)

1974: 5.90E+00  
1975: 3.45E+00  
1976: 4.40E-01  
1977: 9.29E-02  
1978: 9.65E-02  
1979: 1.28E-01  
1980: 8.73E-03  
1981: 3.31E-02

1982: 1.27E-01  
1983: 7.48E-02  
1984: 3.68E-02  
1985: 5.83E-02  
1986: 1.40E-01  
1987: 9.23E-02  
1988: 3.43E-02  
1989: 3.75E-03  
1990: 7.75E-03  
1991: 1.14E-02  
1992: 3.88E-03  
1993: 1.40E-02

Similarly, the Palisades effluent release reports for 1994 to 2000 could be similarly examined in detail. The following reports for 2001 to 2003 clearly show that emissions have continued. In fact, annual reports for 2004 to the present day would show that emissions continue still. Radioactivity emissions into the air, water, and soil are inevitable at Palisades nuclear power plant, and would continue from 2011 to 2031 if allowed.

Palisades' "RADIOACTIVE EFFLUENT RELEASE REPORT: GASEOUS EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2001" ATTACHMENT 2 reports the following:

FISSION & ACTIVATION GASES, Total Release:

1<sup>st</sup> Qtr: 3.01E+00 Ci  
2<sup>nd</sup> Qtr: 2.92E+00 Ci  
3<sup>rd</sup> Qtr: 2.21E-02 Ci  
4<sup>th</sup> Qtr: 0.00

Specific radionuclides are listed individually. See Exhibit 2-B.

In ATTACHMENT 3, "RADIOACTIVE EFFLUENT RELEASE REPORT: LIQUID EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2001" the total release of fission and activation products (not including tritium, gases, and alpha emitters) was reported as:

1<sup>st</sup> Qtr: 2.81E-06 Ci

2<sup>nd</sup> Qtr: 2.45E-04 Ci

3<sup>rd</sup> Qtr: 0.000 Ci

4<sup>th</sup> Qtr: 3.68E-05 Ci

Again, individual nuclides released are identified there. See Exhibit 2-C.

Palisades' "RADIOACTIVE EFFLUENT RELEASE REPORT: GASEOUS EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2002" ATTACHMENT 2 reports the following:

FISSION & ACTIVATION GASES, Total Release:

1<sup>st</sup> Qtr: 5.01E-01 Ci

2<sup>nd</sup> Qtr: 3.20E+00 Ci

3<sup>rd</sup> Qtr: 1.65E+00 Ci

4<sup>th</sup> Qtr: 3.26E+01

Specific radionuclides are listed individually. See Exhibit 2-D.

In ATTACHMENT 3, "RADIOACTIVE EFFLUENT RELEASE REPORT: LIQUID EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2002" the total release of fission and activation products (not including tritium, gases, and alpha emitters) was reported as:

1<sup>st</sup> Qtr: 9.59E-05 Ci

2<sup>nd</sup> Qtr: 0.000 Ci

3<sup>rd</sup> Qtr: 1.83E-04 Ci

4<sup>th</sup> Qtr: 7.48E-07 Ci

Again, individual nuclides released are identified there. See Exhibit 2-E.

Similarly, Palisades' "RADIOACTIVE EFFLUENT RELEASE REPORT: GASEOUS EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2003" ATTACHMENT 2 reports the following:

FISSION & ACTIVATION GASES, Total Release:

1<sup>st</sup> Qtr: 6.07E+01 Ci

2<sup>nd</sup> Qtr: 3.p5E+00 Ci

3<sup>rd</sup> Qtr: 4.96E-01 Ci

4<sup>th</sup> Qtr: 7.42E-01

Individual fission gases identified as being released in various amounts from Palisades include: krypton-85, 87, and 88; Xenon-131m, 133, 135m, 138; individual Iodines identified as being released in various amounts from Palisades include: Iodine 131, 132, 133, 135; Particulates with half-lives greater than 8 days include: Chromium-51; Manganese-54; Cobalt-58; Cobalt-60; Niobium-95; Ruthenium-103; Strontium-89; Strontium-90; Cesium-134; Cesium-137; Zirconium-95; Cobalt-57; as well as net identified beta emitters. See Exhibit 2-F.

In ATTACHMENT 3, "RADIOACTIVE EFFLUENT RELEASE REPORT: LIQUID EFFLUENTS – SUMMATION OF RELEASES: JANUARY—DECEMBER 2003" the total release of fission and activation products (not including tritium, gases, and alpha emitters) was reported as:

1<sup>st</sup> Qtr: 2.09E-04 Ci

2<sup>nd</sup> Qtr: 5.40E-04 Ci

3<sup>rd</sup> Qtr: 0.000 Ci

4<sup>th</sup> Qtr: 1.45E-03 Ci

Again, individual nuclides released are identified there. See Exhibit 2G.

As the NAS BEIR VII Report found, even so-called “low” level radiation exposure has a negative, adverse impact on human health.

Petitioners challenge the methodology upon which all of these annual reports are based. On September 13, 2005 Kevin Kamps of NIRS spoke by phone with a worker at the City of South Haven, Michigan's Water Filtration Plant. The City of South Haven's Water Filtration Plant supplies drinking water to customers in the City and townships of Casco, Covert and South Haven. This plant supplies water to nearly 3,400 customers located in these areas. The water comes from Lake Michigan, a surface water source, through an intake pipe located about a mile offshore from South Beach in the City of South Haven, just several miles north and downstream (given the prevailing direction of flow in Lake Michigan) from the Palisades nuclear power plant, which emits radioactivity into the waters of Lake Michigan daily. The lake water is treated, settled, filtered and disinfected as it goes through the Water Filtration Plant, but radioactivity is not removed by any of these processes.

The worker at the Water Filtration Plant explained that while he does collect samples of Lake Michigan water on a daily and monthly basis to test for radiation, he turns those samples over to the Palisades nuclear power plant, which then performs the testing itself (and/or through subcontractors). This fox-guarding-the-henhouse transfer of the water samples back into the hands of the Palisades nuclear power plant represents an unacceptable methodology, given its vulnerability to falsification by Palisades personnel, which would be in the interest of Palisades, to under-report radioactivity levels in the source of drinking water for nearby communities. Genuinely independent radiation monitoring must be performed, without the risk

of falsification by the very company that stands to benefit from low reports of radiation in the water

NMC states (NMC Answer p. 16) that "...Petitioners. . .failed to provide any 'alleged facts' or 'expert opinion that supports the contention.'" To the contrary, Petitioners have consulted with Dr. John Robbins, a Great Lakes limnologist recently retired from the U.S. Chamber of Commerce, National Oceanographic and Atmospheric Administration (NOAA), Great Lakes Environmental Research Laboratory (GLERL) in Ann Arbor, Michigan (where, among other things, he specialized in analyzing radioactivity in the Great Lakes, being referenced in such publications as the International Joint Commission's Nuclear Task Force's December 1997 "Inventory of Radionuclides for the Great Lakes," namely, the report he co-authored in 1980 entitled "Plutonium in the Great Lakes," which appeared in "Transuranic Elements in the Environment," edited by W.C. Hanson, published by the U.S. Dept. of Energy, see specifically pages 659 to 683 of that report, referenced on page 98 of the IJC report). See Exhibit 2-H. Dr. Robbins has established that the predominant current flow is from south to north in Lake Michigan near the Palisades nuclear reactor. Therefore, not only the new intake built just offshore from Palisades, but the old intake at South Beach in South Haven are directly in line for radioactive and toxic chemical contamination. Dr. Robbins believes that it is not implausible, on average, for those water intakes to serve as radioactivity receptors from the emissions into Lake Michigan at Palisades. Thus, the drinking water for South Haven, Casco, and Covert could very well be contaminated with radioactivity from Palisades, which, even at so-called low levels, would have an adverse impact on human health, as found by the NAS BEIR VII Report.

To confirm the direction of Lake Michigan water flow in the vicinity of Palisades, Dr. Robbins referred us to Dr. Dave Schwab, who still works at NOAA's GLERL. Dr. Schwab is

one of the top experts on the direction of flow of Lake Michigan's waters. Dr. Schwab confirms that the prevailing direction of Lake Michigan water flow is from south to north, the very direction of flow that would carry radioactivity and toxic chemicals released by Palisades into the drinking water intakes for South Haven, Casco, and Covert. Dr. Schwab pointed to the following field data to support this finding:

Gerald Miller, Michael McCormick, James Saylor  
 Great Lakes Environmental Research Lab  
 2205 Commonwealth Blvd.  
 Ann Arbor, MI 48105  
 Phone: 734/741-2119, 734/741-2277, 734/741-2118  
 FAX: 734/741-2055  
 Email: michael.mccormick@noaa.gov

GLERL Vector Averaging Current Meter (VACM) Moorings 10/1999-06/2000  
 Manufacturer: EG&G  
 Header Line: N Lat (dec. deg), W. Lon (dec. deg), VACM Depth (m), Inst. No.,  
 Year Deployed, Mooring Name  
 Explanation of Columns in the Data Set  
 YEAR Year (UT)  
 DOY Day of year (UT)  
 TIME Universal time (UT - Hours and minutes HHMM)  
 E Eastward component of mean horizontal current (cm/s)  
 N Northward component of mean horizontal current (cm/s)  
 WT Water Temperature (deg C)

Data Sources:

File Name	Mooring	Lat (N)	Lon (W)	Inst No.	Depth	Dates	VACM/Water	Op #
V01-1999-12M.txt	V01-99	41 48.89'	86 40.80'	556	556	No Data	12/20m	S1999294.01
V01-1999-19M.txt	V01-99	41 48.89'	86 40.80'	265	265	10/20/99-06/15/00	19/20m	S1999294.01
V03-1999-14M.txt	V03-99	41 58.17'	86 57.34'	569	569	10/20/99-06/15/00	14/62m	S1999293.03
V03-1999-61M.txt	V03-99	41 58.17'	86 57.34'	348	348	10/20/99-06/15/00	61/62m	S1999293.03

V04-1999-10M.txt V04-99 41 54.85' 86 40.74' 347 10/20/99-06/15/00 10/18m S1999294.02  
(A)  
V04-1999-17M.txt V04-99 41 54.85' 86 40.74' 354 10/20/99-06/15/00 17/18m S1999294.02  
(A)  
V05-1999-12M.txt V05-99 41 57.95' 86 44.82' 572 10/20/99-06/15/00 12/40m S1999293.05  
V05-1999-39M.txt V05-99 41 57.95' 86 44.82' 551 10/20/99-06/15/00 39/40m S1999293.05  
V06-1999-13M.txt V06-99 42 00.53' 86 47.90' 274 10/20/99-06/14/00 13/61m S1999293.04  
V06-1999-60M.txt V06-99 42 00.53' 86 47.90' 311 10/20/99-06/14/00 60/61m S1999293.04  
V07-1999-11M.txt V07-99 42 07.41' 86 41.19' 574 No Data 11/59m S1999299.01  
V07-1999-58M.txt V07-99 42 07.41' 86 41.19' 319 10/26/99-06/14/00 58/59m S1999299.01  
(B)  
V08-1999-09M.txt V08-99 42 15.18' 86 39.87' 279 10/26/99-06/13/00 09/57m S1999299.02  
V08-1999-56M.txt V08-99 42 15.18' 86 39.87' 568 10/26/99-06/13/00 56/57m S1999299.02  
V09-1999-11M.txt V09-99 42 14.51' 86 25.19' 573 10/27/99-06/14/00 11/19m S1999300.05  
V09-1999-18M.txt V09-99 42 14.51' 86 25.19' 352 10/27/99-06/14/00 18/19m S1999300.05  
V10-1999-10M.txt V10-99 42 15.83' 86 27.90' 553 10/27/99-06/14/00 10/28m S1999300.04  
V10-1999-27M.txt V10-99 42 15.83' 86 27.90' 277 10/27/99-06/14/00 27/28m S1999300.04  
V11-1999-10M.txt V11-99 42 17.20' 86 31.35' 555 10/27/99-06/14/00 10/38m S1999300.03  
V11-1999-37M.txt V11-99 42 17.20' 86 31.35' 280 10/27/99-06/13/00 37/38m S1999300.03  
V12-1999-11M.txt V12-99 42 20.27' 86 38.08' 583 10/27/99-06/13/00 11/59m S1999300.02  
V12-1999-58M.txt V12-99 42 20.27' 86 38.09' 349 10/27/99-06/13/00 58/59m S1999300.02  
V13-1999-13M.txt V13-99 42 20.04' 86 21.65' 577 10/19/99-04/25/00 13/21m S1999292.01  
V13-1999-20M.txt V13-99 42 20.04' 86 21.65' 576 10/19/99-04/25/00 20/21m S1999292.01

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(A) Water temperature only  
(B) Current velocity data ends 10/26/99, water temperature to end.  
Missing data denoted by -999.0

Manufacturers specifications:

Velocity: Threshold 2.5 cm/s

Rotor Constant 34.6 cm/rev

Temperature: Accuracy +-0.1C

Compass: Accuracy +-5 deg

See [http://www.glerl.noaa.gov/eegle/data/1999-00/moor\\_miller/vacm.meta.txt](http://www.glerl.noaa.gov/eegle/data/1999-00/moor_miller/vacm.meta.txt) for a better laid out format, and also see [http://www.glerl.noaa.gov/eegle/data/objects/obj\\_18.V13.4.html](http://www.glerl.noaa.gov/eegle/data/objects/obj_18.V13.4.html)

Station V-13 is the closest to Palisades, and thus the most relevant to questions of Lake Michigan water flow direction in the vicinity of the reactor. Dr. Schwab has mostly addressed the macro level of water flow in Lake Michigan, but is now delving into the issue of micro level of water flow. Thus, he will address locales of tight scope, such as the immediate vicinity of the Palisades reactor, so close as it is to one operational and one potential source of drinking water for the residents (and large numbers of visitors, given the tourism of the Lakeshore region) in South Haven, Casco, and Covert.

Additionally, Dr. Rosalie Bertell, GNSH, with the International Institute of Concern for Public Health, has provided consultation to Petitioners. Dr. Bertell has also served as a longtime National Advisory Board member of NIRS. Dr. Bertell has served on the Nuclear Task Force of the International Joint Commission, where she helped in the publication of the "Inventory of Radionuclides for the Great Lakes," (Dec. 1997), as well as the 1999 "Report on Bioaccumulation of Elements to Accompany the Inventory of Radionuclides in the Great Lakes Basin." Dr. Bertell has worked professionally in Environmental Epidemiology since 1968, served on the Advisory Boards for the Great Lakes Health Effects Program of Health Canada, and the Ontario Environmental Assessment Board and has been a member of the IJC Science Advisory Board. She has published a "Handbook for Estimating the Health Effects of Exposure to Ionizing Radiation" and the popular non-fiction book "No Immediate Danger: Prognosis for a Radioactive Earth," together with more than 100 other publications. She has provided consultation to Petitioners on the issue of performing water sampling near Palisades in order to correct the methodological flaw mentioned earlier of Palisades handling the water samples before they are actually tested by an independent institution.

Dr. Bertell referred Petitioners to Dr. Hari Sharm in Waterloo, Ontario, Canada, a nuclear chemist who can test for radioactivity and toxic chemicals in Lake Michigan water

samples for Petitioners. Dr. Sharm has expressed an interest in helping to carry out this vital work and is assisting Petitioners in the process of developing a methodology for carrying out this independent assessment on the radiation and toxic chemicals being emitted by the Palisades nuclear power plant into the drinking water source, Lake Michigan, for the residents and visitors in South Haven, Casco, and Covert.

The basis-with-reasonable-specificity standard requires that an intervenor include in a safety contention a statement of the reason for his contention. This statement must either allege with particularity that an applicant is not complying with a specified regulation, or allege with particularity the existence and detail of a substantial safety issue on which the regulations are silent. *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), LBP-82-106, 16 NRC 1649, 1656 (1982), citing 10 CFR § 2.335 (formerly § 2.758). While NRC regulations have not yet changed to accommodate the conclusions of BEIR VII, this major scientific pronouncement compels a rethinking of the exposure of the public to routine radiation emissions from Palisades through their water supply. A substantial safety issue is exposed in this contention, and it must be admitted for the inquiry of a contested hearing.

**Response as to Contention No. 3 (*The Palisades reactor has no place to store its overflowing irradiated nuclear fuel inventory within NRC regulations*)**

The Staff argue that “[t]his proposed contention lacks basis and support . . . [and] fails to establish that a genuine dispute exists on a material issue of law or fact. . . .” Staff Answer p. 15. The Nuclear Management Company maintains that the contention is “...inadmissible because it is not supported by a basis demonstrating the existence of a genuine material dispute.” NMC Answer p. 16. In a way, the Petitioners agree; there is no material dispute over the facts, but the facts compel the conclusion that Palisades’ dry cask storage arrangements

violate NRC regulations.

Specifically, the material facts prove - and exceed the threshold showing that must be made here - that neither the old nor the more recent, "new" concrete pads holding dry casks at Palisades conform with longstanding NRC requirements for earthquake stability standards. As the attached Affidavit of Dr. Ross Landsman, formerly of the Nuclear Regulatory Commission staff, depicts, both pads were built on compacted sand and other subsurface materials, dozens of feet above bedrock and well above the ground elevation of the nearby nuclear power plant. Dr. Landsman, who has decades of experience and a direct oversight role in the inspection of dry cask storage at Palisades when he worked at NRC Region III during the critical period of dry cask storage installation and operation from 1993 to 2005, has concluded from his personal knowledge of the subsoil conditions that the older pad nearer the lake is in violation of NRC liquefaction regulations under 10 CFR Part 72.212(b)(2)(i)(B)<sup>24</sup>, while the newer pad further inland is in violation of NRC amplification regulations under the same regulations. Neither the older nor newer dry cask storage pads at the Palisades plant were designed in consideration of the factors contained in the cited regulation. See Landsman Affidavit, ¶ ¶ 3-13.<sup>25</sup> Either violation, then, violates 10 CFR 72.212(b)(3).<sup>26</sup> This means that the cask storage pads ***have violated NRC regulations since they were constructed, and absent enforcement will continue to violate NRC regulations during a 20-year license***

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<sup>24</sup>[The general licensee shall perform written evaluations, prior to use, that establish that]: Cask storage pads and areas have been designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction, and soil liquefaction potential or other soil instability due to vibratory ground motion.

<sup>25</sup>The Landsman Affidavit appears in electronic form annexed hereto and also in hard copy at pp. App. 3-a through 3-d of the "Petitioners' Appendix of Evidence in Support of Contentions."

<sup>26</sup>[The general licensee shall]: Review the Safety Analysis Report (SAR) referenced in the Certificate of Compliance and the related NRC Safety Evaluation Report, prior to use of the general license, to determine whether or not the reactor site parameters, including analyses of earthquake intensity and tornado missiles, are enveloped by the cask design bases considered in these reports. The results of this review must be documented in the evaluation made in paragraph (b)(2) of this section.

***extension and beyond.***

The NRC, unfortunately, considers the older pad nearer the lake to be in compliance with regulations and allows NMC to store high-level radioactive waste there, while the NRC is supposedly still trying to resolve through ongoing inspection, investigation, and analysis the status of the newer pad, which is situated further inland from Lake Michigan. However, during this alleged period of ongoing investigation, the NRC is allowing NMC to store waste on the new pad despite the unresolved safety concerns. Dr. Landsman's understanding is that the newer pad was built big enough to accommodate all the dry casks currently stored on the older pad nearer the lake, because, despite public pronouncements to the contrary by Consumers Energy, Nuclear Management Company, and the NRC, the older pad clearly violates regulations, which means that the 18 to 19 casks currently stored on the older pad<sup>27</sup> must be moved to the newer pad. The problem is, moving the casks from the older pad to the newer one is analogous to jumping from the frying pan into the fire.

Dr. Landsman sought repeatedly while he worked for the NRC to see this unresolved safety issue corrected. Now, however, four casks are being stored on the newer pad. In addition, plans have been in place for additional casks to be loaded and stored on the newer pad in the near future, perhaps as early as fall 2005.

While the NRC staff inveighs (Staff Answer p. 16) that "[p]etitioners lack the requisite

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<sup>27</sup>Including the unloadable, unmovable cask #4 at Palisades, loaded in June 1994 and shortly thereafter admitted by Consumers Power to be defective, having faulty welds. Now, eleven years on, Consumers has yet to unload the defective cask, because it technically cannot do so safely. And the configuration of the 18 to 19 dry casks currently stored on the older pad nearer Lake Michigan is such that the casks furthest back cannot be moved or unloaded until all other casks in front of them have been moved out of the way first. This situation increases the risks, making it very difficult to address emergencies involving certain casks in the configuration in a timely manner.

Although Petitioners/Intervenors are withdrawing their Contention No. 7 concerning dry cask #4 as a separate contention (see *infra*), Palisades' noncompliance with earthquake standards has elevated portents for this particular vessel of high-level radioactive waste.

basis and support for their claim, highlighted by the fact that they have not produced any affidavits or other evidence as to the opinion of their 'anticipated expert,' the NRC had the benefit for years of Petitioners' expert's warnings and has done little to nothing about it, contrary to the agency's mission and mandate to protect public health and safety and the environment. NMC states (NMC Answer p. 19) that "Contention 3 is not supported by a basis demonstrating a genuine issue." Actually, it is the dry cask storage pads, and the very deadly high-level radioactive waste they hold, that is not supported by a base that is safe and secure from earthquake dangers. NMC further urges (Answer p. 19) that "[t]he results of the licensee analysis showed that the [older] pad could support the casks safely. The results are documented in a letter to the NRC dated July 27, 1994." NMC additionally cites the NRC's September 20, 1994 "Independent NRC Staff Final Safety Assessment of the Dry Storage Facility at Palisades Nuclear Power Plant Site" as further proof of issue resolution. NMC likewise points out a June 5, 1995 NRC Information Notice (95-28, "Emplacement of Support Pads for Spent Fuel Dry Storage Installations at Reactor Sites," p. 3) as proof that all is fine at the older pad nearer the lake.

But both the Staff and NMC somehow have failed to disclose the contents of a letter written by Dr. Landsman while at NRC Region III as a safety engineer and dry cask storage inspector overseeing Palisades, to the then-Commission Chairman, Ivan Selin, on February 17, 1994, warning that:

[I]f you use NRC-approved casks under Subpart K [of 10 CFR Part 72], the regulations are silent about the foundation material or the pad. Actually, it's the consequences that might occur from an earthquake that I'm concerned about. *The casks can either fall into Lake Michigan or be buried in the loose sand because of liquefaction. . . .It is apparent to me that NMSS [sic] doesn't realize the catastrophic consequences of their continued reliance on their current ideology.* (Emphasis added)

Dr. Landsman has never received a meaningful response to this warning and would attest

under oath at the hearing of this contention that his safety concerns about the older pad, which involve violations of NRC regulations and violations of public health and safety and environmental protection - remain inadequately addressed and unresolved to this day.

The NRC staff (Staff Answer p. 16) asserts that “[t]his part of the Commission’s regulations has no relation to license renewal.” NMC states (Answer p. 16) that “[t]his contention is beyond the scope of 10 CFR Part 54, because the dry cask storage pads are part of the Independent Spent Fuel Storage Installation (‘ISFSI’) facility which is distinct from – and licensed separately from – the Palisades nuclear power plant.” Both responses are disingenuous. It is impossible to disconnect the dry cask storage pad problems from the proposed license extension. If both dry cask storage pads violate NRC safety regulations and are barred from use, then where, exactly, would NMC store its bulging inventory of irradiated nuclear fuel? And where would the 22 to 23 dry casks already loaded and stored on those defective pads at Palisades be moved to? These are not rhetorical questions; the answers are integral to the 20 year license extension proposal, given that high-level radioactive waste is an inevitable byproduct of electricity production at the Palisades nuclear reactor.

NRC staff also claim (Staff Answer p. 16) that this contention impermissibly attacks NRC regulations, specifically the GEIS on reactor license extension as well as the “Nuclear Waste Confidence Rule.” But, truth be told, at present there is no place for the wastes generated during a 20 year license extension at Palisades to be stored without violating NRC regulations. The NRC’s “Nuclear Waste Confidence Decision” places *false* confidence in the availability of a geologic repository in the U.S. by the year 2025, and biases the NRC in favor of approving a license for the proposed Yucca Mountain, Nevada dumpsite (the only one under consideration). It also, by implication, biases the NRC in favor of approving a 20-year license extension at Palisades.

NMC dismisses this contention (NMC Answer p. 18) by stating “. . . it is a challenge. . .to the generic findings in the GEIS and Appendix B to Part 51.” NMC further cites a Commission ruling on license extension at Oconee which states that “[t]he Commission’s generic determinations governing onsite waste storage preclude the Petitioners from attempting to introduce such waste issues into this adjudication.” But there was not firm evidence of regulatory violation concerning onsite waste storage in the Oconee proceeding. Presumably when the NRC establishes generic findings regarding on-site waste storage it assumes either that its safety regulations are being met at the particular nuclear plant in question, or else that it plans to take enforcement action against any violations of its regulations. But, Petitioners here have articulated evidence that tends to prove in a compelling fashion that **both** of the dry cask storage pads at Palisades are in violation of NRC earthquake regulations. This begs the question, why is NRC allowing high-level radioactive waste storage on pads at Palisades that are in violation of NRC earthquake regulations?

At page 17 of its Answer, NMC states as fact something which is wholly false: that “[b]oth site specific and general licenses are issued for a maximum of 20 years, not 40 years as for nuclear power plants.” Yet, late last year, the NRC Commissioners, by a 2 to 1 split decision (with NRC Chairman Nils Diaz voting against the proposal), approved a 40 year license extension at the Surry Nuclear Power Plant ISFSI in Virginia, the oldest ISFSI in the U.S. So while the initial license may be granted for an initial 20 year period, NRC has indeed granted a license extension for an ISFSI for 40 years. This potentially monumental safety error could well be relicensed.

On page 18 of its Answer, NMC misconstrues Petitioners’ contention, perhaps to mislead the Board. NMC states “[t]he regulations do not require licensees to explore the aging of components for a facility not covered by this license renewal proceeding. . .”. It is not the

aging of the pads that is at the heart of this contention (although pad deterioration over time is a significant safety issue that must be addressed as well), but rather the fact that both ISFSI pads at Palisades have continuously violated NRC earthquake regulations since the day they were built.

At the August 28, 2005 NRC public meeting in South Haven concerning the proposed 20 year license extension at Palisades, neither NRC nor Nuclear Management Company officials could give the number of dry casks already loaded on the two pads at Palisades. Even if the Staff and NMC don't ascribe the requisite seriousness to these issues - given the deadly nature of high-level radioactive waste - the Board must.

All that is required for a contention to be acceptable for litigation is that it be specific and have a basis. Whether or not the contention is true is left to litigation on the merits in the licensing proceeding. *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), LBP-89-28, 30 NRC 271, 282 (1989), aff'd on other grounds, ALAB-940, 32 NRC 225 (1990); *Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 1, 2 and 3), LBP-91-19, 33 NRC 397, 411 (1991), appeal denied, CLI-91-12, 34 NRC 149 (1991). Here, the facts alleged, coupled with the expert opinions proffered, easily meet those requirements.

A Licensing Board should not address the merits of a contention when determining its admissibility. *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), LBP-82-106, 16 NRC 1649, 1654 (1982), citing *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542 (1980); *Kansas Gas & Electric Co.* (Wolf Creek Generating Station, Unit 1), LBP-84-1, 19 NRC 29, 34 (1984); *Commonwealth Edison Co.* (Braidwood Nuclear Power Station, Units 1 and 2), LBP-85-11, 21 NRC 609, 617 (1985), rev'd and remanded on other grounds, CLI-86-8, 23 NRC 241 (1986). The petitioner simply

must provide sufficient information to establish the existence of a genuine dispute with the applicant on a material issue of law or fact. 10 CFR § 2.309(f)(1)(v) (formerly 2.714(b)(2)(iii)). See *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-91-35, 34 NRC 163, 166, 169-170, 175-76 (1991); *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-91-39, 34 NRC 273, 279 (1991); *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center), LBP-91-41, 34 NRC 332, 338 (1991); *Northeast Nuclear Energy Company* (Millstone Nuclear Power Station, Unit 2), LBP-92-28, 36 NRC 202, 214 (1992); *Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), CLI-93-3, 37 NRC 135, 142 (1993); *Sacramento Municipal Utility District* (Rancho Seco Nuclear Generating Station), LBP-93-23, 38 NRC 200, 205 (1993); *Gulf States Utilities Co.* (River Bend Station, Unit 1), CLI-94-10, 40 NRC 43, 51 (1994). Certainly, Petitioners have in respect to this contention shown material facts which implicate serious issues of regulatory law. The ASLB, given the strong facial showing Petitioners have made, cannot inquire more deeply into the merits of the contention, but instead must admit it for hearing.

The standard for a safety contention in operating license cases (Petitioners recognize this is not an operating license case) is relatively loose; a contention about a matter not covered by a specific rule need only allege that the matter poses a significant safety problem [10 CFR § 50.57(a)(3)] for finding of reasonable assurance of operation without endangering the health and safety of the public. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), LBP-82-116, 16 NRC 1937, 1946 (1982). Here, of course, the contention alleges in compelling fashion the continuous violations of specific regulations. As it appears they would easily meet the operating license standard for a safety issue, the panel must admit their contention for the *continuation* of that operating license for 20 years beyond its expiration.

Because as a matter of fact, Petitioners have met - and exceeded - the pleading

requirements for this contention, the Board must, as a matter of law, proceed to hear it on the merits.

**Response as to Contention No. 7 (*Non-radiological persistent toxic burdens to area water sources*)**

NRC staff claim (Answer p. 22) that this contention “lacks specificity and support.”

Below is the actual NPDES report summarizing a number of areas in which Palisades is not in compliance with its National Pollution Discharge Elimination System permit requirements, specifically in continuing non-compliance concerning the toxic chemical Betz Clam-Trol.

NPDES NUMBER	GRANT	LIMIT	VIOLATION	ENFORCEMENT	STATUS
INSTANCE OF	NONCOMPLIANCE	RNC DATE	ENFORCEMENT		
ACTION	DATE	STATUS DATE	COMMENTS		
*****					
0CPCO-PALISADES POWER PIT			NON-COMPLIANT		
COVERT					
MI0001457	***FINAL***				

\*\*\*\*\* SUMMARY SECTION \*\*\*\*\*

PH	001A	11/30/00		NC	CONTINUING NONCOMPLIANCE
TRO-DISCHARGE TIME	001A	11/30/00		NC	CONTINUING NONCOMPLIANCE
OXIDANTS, TOTAL RESIDUAL	001A	11/30/00		NC	CONTINUING NONCOMPLIANCE
BETZ CLAM-TROL CT-2	001A	11/30/00		NC	CONTINUING NONCOMPLIANCE
BETZ CLAM-TROL CT-4	001A	11/30/00		NC	CONTINUING NONCOMPLIANCE

“Continuing Noncompliance” indicates that the violation cited in the above summary was not the first time such a violation had occurred, so that violations on limits of releases of persistent toxic chemicals from Palisades nuclear power plant into the waters of Lake Michigan appears to be an unfortunate, and harmful, pattern. As late as 2003 and 2004, the formal NPDES reports on the use of Clam-Trol at Palisades were mere recitations of the 2000 reporting data.

See <http://www.epa.gov/region5/water/weca/reports/mi2qtr04.pdf> (for 2004), and

<http://www.epa.gov/region5/water/weca/reports/mi2qtr03.pdf> (for 2003).

Thus, NMC’s claim (Answer p. 26) that Petitioners’ reference provides “no basis for

Petitioners' allegation or 'apparent multiple misuses of Betz Clam-Trol'" is false, for "continuing noncompliance" indicates a pattern extending over time.

The NRC staff states (Answer p. 22) that "it is not within the [Nuclear Regulatory] Commission's jurisdiction to make any determination as to the adequacy of such permits [such as NPDES permits] in protecting the environment." Yet the scope of 10 CFR Part 54 (set out at §54.4) encompasses "(a) Plant systems, structures, and components . . . [including] (2) All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1) (i), (ii), or (iii) of this section." Presumably, maintaining unclogged water intakes at Palisades fall within this scoping parameter. If so, then NPDES noncompliance is a relevant issue because NMC is not being truthful about the measures it is taking concerning the perennial clogging problem caused by zebra mussels in Lake Michigan. This disregard for compliance with regulations, not to mention indifference to the environmental health of Lake Michigan and the public health impacts of persistent toxic chemicals released as part of reactor operations does not comport with the NRC's supposed mandate and mission to protect public health and the environment.

Palisades' ongoing releases of persistent toxic chemicals into Lake Michigan is a violation of the letter and spirit of the "Ninth Biennial Report On Great Lakes Water Quality" by the International Joint Commission, the binational U.S.-Canadian federal governmental agency whose mandate and mission is protecting and preserving the Great Lakes. At page 35 of that IJC report, it states:

**Specific Persistent Toxic Substances:**

The Commission reiterates from its Sixth Biennial Report that, under the Agreement, (Great Lakes Water Quality Agreement of 1978) 'the overall strategy or aim regarding persistent toxic substances is virtual elimination, and the tactic or method to be used to achieve that aim is through zero input or discharge of those substances created as a result of human activity.' This is both necessary and reasonable. 'Persistent toxic substances are too dangerous to the biosphere and to humans to

permit their release in any quantity.'

Twenty additional years of such toxic chemical emissions from Palisades into Lake Michigan - especially if they are too inconvenient to report - will have a significant adverse impact on human and ecosystem health.

There regulations requirement that an intervenor supply the bases on which the intervenor intends to rely. *Georgia Power Company* (Vogtle Electric Generating Plant, Units 1 and 2), LBP-94-22, 40 NRC 37, 39 (1994).

Nonreporting of important, and required, information about toxic releases obscures any meaningful evaluation of the functioning of nonsafety features of Palisades which will be necessary to plant operations during the license extension period. This contention should be admitted.

**Response as to Contention No. 8 (*Environmental justice denied by the continuing operations of Palisades*)**

NMC states (NMC Answer p. 28) that Petitioners “. . .fail to challenge the Application and to demonstrate the existence of a genuine dispute on a material issue of fact or law...” and “fail[s] to provide an adequate factual basis to support any dispute with the Application.” NMC states that “...none of Petitioners’ claims address the ‘essence of an environmental justice claim’ arising under NEPA in a NRC licensing proceeding – *i.e.*, ‘disproportionately high and adverse human health and environmental effects’ on minority and low-income populations that may be different from the impacts on the general population.”

Petitioners dispute these conclusions. The heart of the contention is that Palisades’ 20-year license extension could very well adversely affect minority and low-income populations in disproportionately high ways not faced by the general population in the area, in particular upon Native Americans.

NMC cites (NMC Answer p. 30) NRC pleading rules requiring that contentions “must include references to specific portions of...the applicant’s environmental report...that the petitioner disputes and the supporting reasons for each dispute.” Petitioners take greatest issue with NMC’s Environmental Report, Section 2.10, entitled “Historic and Archaeological Resources.”

The Environmental Report gives very short shrift to historic and archaeological resources. The potential for Native American burial sites, or other Native sites such as former villages or encampments, at or near Palisades is not mentioned anywhere in the Environmental Report.

Petitioners submit that the conclusion “no significant historical or archaeological resources were known to occur in the study area” is unsupported by the “Attachment C. Cultural Resources Correspondence” found in the Report. There are just two letters, one from Consumers/NMC to the Michigan State Historic Preservation Office, the second from the Department of the Interior to the Atomic Energy Commission.

Respecting the February 11, 2005 letter from Dan Malone at NMC and Stephen Wawro at Consumers to Ms. Martha MacFarlane-Faes at the Michigan State Historic Preservation Office (MSHPO), the first paragraph reveals that MSHPO has “concern pertaining to possible unreported archaeological properties on, or within the vicinity of, the Palisades site.” Yet NMC fails to include any documentation spelling out these concerns from MSHPO in the companies’ Environmental Report, other than the brief mention that concerns exist.

Also in the letter, Malone and Wawro state in conclusory fashion that 20 more years of nuclear activities at the site will not disturb the land, and “Therefore, NMC and Consumers do not believe a survey of the project area is necessary, as Federal and state agencies have confirmed on multiple occasions that no historic properties, archeological or architectural, are

known to exist on, or in the immediate vicinity of the Palisades site.”

However, Petitioners fear that 20 more years of operations at Palisades risks a large-scale radiological accident. Even if no accident were to occur, the daily operations of Palisades nuclear power plant releases “low” levels (and sometimes, not-so-low levels) of radioactivity into the air, water, and soil. It also generates high-level radioactive waste, large quantities of which have already been stored at Palisades for nearly 40 years, and ever-growing quantities of which will continue to be stored on-site for at least several decades to come, even if dumps targeted at Native American lands out West (sacred Western Shoshone Indian treaty land at Yucca Mountain, Nevada; the Skull Valley Goshute Indian Reservation in Utah) are opened. Since the actual opening of such dumps is ever more doubtful, this means that Palisades’ high-level radioactive waste could remain on-site indefinitely into the future. The “routine” or “accidental” radioactive contamination caused by 20 additional years of operations at Palisades would be a significant adverse impact upon Native American burial or other sites located there. Such sites are considered sacred and religiously significant in the cultures of many Native American tribes, so befouling these sites with radioactive or toxic chemical contamination or heavy industrial usage could qualify as a desecration under the terms of the federal Native American Freedom of Religion Act.

Certainly this qualifies as a disproportionate, highly adverse impact on Native Americans, that, for example, European-Americans do not face from 20 more years of operations at Palisades. There most likely are not European-American sacred burial grounds at the Palisades site, nor former village sites (also considered sacred and worthy of great respect by Native cultures) there. But there is certainly the potential, and perhaps the likelihood, that burial sites or former encampment, habitation, or village sites exist on the Palisades property. Lea Foushee, a Native American woman at the North American Water

Office in Minnesota, has explained to Petitioners that beautiful vistas were often chosen as burial sites by Native Americans since time immemorial. Palisades certainly overlooks a beautiful vista to the west, overlooking Lake Michigan. Native American cultures in Michigan also regard the westward direction as the one people travel when they pass away, passing through the “Western Door,” making it even more likely that burial sites exist at or near Palisades. Traditional Grand River Band of the Odawa Indians storyteller Larry Plamondon also has told Petitioners that rivers and creeks were often chosen as habitation sites by Native Americans since time immemorial.

The Palisades nuclear power plant is bounded not only by the lakeshore to the west, but by the Brandywine Creek to the immediate south, as well as an even larger creek to the immediate north in Van Buren State Park. The possibility for significant Native American archaeological resources on the Palisades site is very real, and should not be so flippantly dismissed by NMC. It is irresponsible that NMC and Consumers would state so strongly that no “survey of the project area is necessary” when it, and federal and state agencies, appear to have done little if any such surveying in the past.

The only documentation NMC and Consumers give in their Environmental Report to support their claims is a letter dated April 7, 1972 from the U.S. Department of the Interior (DOI) to the U.S. Atomic Energy Commission (the predecessor to today’s NRC). In that letter, DOI states “It does not appear that the existing plant should directly affect any existing or proposed unit of the National Park System, nor any site eligible for registration as a national historic, natural or environmental education landmark; however, the final statement should contain evidence of consultation with the State Historic Preservation Officer concerning the effects of the power station on places on or being considered for nomination to the National Register of Historic Places.” This statement seems potentially irrelevant to such issues as

Native American burial sites, former village sites, etc. located on the power plant site or along the transmission line corridor. It's interesting that consultation with the Michigan State Historic Preservation Officer is mentioned, because from Petitioner Kevin Kamps' (of NIRS) recent contact with Ms. Martha MacFarlane-Faes at MSHPO by phone on August 30, 2005, it appears that very little consultation had taken place between her office and the companies involved. In fact, she admitted that the "ball may have been dropped" on these important matters. The MSHPO's files on this matter do not put to rest the question as to whether or not Native American archaeological resources at the Palisades site could be in harm's way if a 20 year license extension were granted. It's clear that the companies, Consumers and NMC, as well as the state and federal agencies, have allowed this license extension proceeding to progress to this advanced stage without adequately addressing the potential impacts to Native American sites, rights, and values.

The U.S. federal and State of Michigan agencies also have not adequately consulted with the impacted tribes in a meaningful, government-to-government manner, as is required under treaty, law, and regulation. In its February 2005 letter to the Michigan State Historic Preservation Office, NMC and Consumers also mention that: "A May 19, 1972 letter from the Michigan State Liaison Officer for Historic Protection to the AEC [Atomic Energy Commission] confirmed the DOI's determination and stated that Palisades would not 'adversely affect known historical or archaeological resources of the State of Michigan.'" They go on to state that a "Terrestrial Ecological Survey" conducted 26 years ago by a private contractor paid by Consumers "found no significant historical or archaeological resources were known to occur on the Palisades site" and that these findings were confirmed by the Director of the Michigan Department of State's Michigan History Division, which verified that "no significant historical or archaeological sites had been found in the immediate area of Palisades." We question how

“significant” and “immediate” were and are defined by these profit-driven private companies, and by these state agencies? Are Native American sites such as burials or villages considered significant, especially 25 to 40 years ago, when many of these reports referred to were published? It seems imperative that an updated, comprehensive, independent site survey be conducted before Palisades is granted a license to perform nuclear and other activities on this site for another 20 years.

It appears from the lack of supporting documentation that neither the AEC nor the DOI ever did a careful survey of the Palisades site or adjoining transmission lines. NMC and Consumers seem unconcerned about the potential for unknown Native American burial sites or other cultural resources. Yet, given the presence of creeks just north and just south of the Palisades nuclear power plant site, it seems all the more likely that Native American villages or encampments might have been located there. And given the forested, large dunes surrounding the Palisades nuclear power plant, it seems possible that even burial sites might be located there, especially considering the great beauty of the area, and the remarkable view to the west over Lake Michigan. One definition for “palisade,” after all, is “a line of bold cliffs.” (Webster’s New Collegiate Dictionary) It very well may be that the hundred-year-old Palisades Park summer community with 200 cottages immediately south of the Palisades nuclear power plant took its name from the “cliffs,” or tall forested sand dunes, on the site. Certainly Palisades nuclear plant took its name from the Palisades Park community, much to the chagrin of the residents, many of whom have opposed the nuclear reactor since before it was built in the late 1960s.

NMC and Consumers state in the 2005 letter that adequate protections are in place to safeguard cultural resources on the site. They write “Examples of activities requiring an Environmental Review include disturbance of 1 or more acres of previously undisturbed land,

any earth change within 600 feet of water, wetland and waterway activities, and structural interference with landforms, lakes and streams, among others.” But, given the decades of apparent lack of concern, perhaps it should not be surprising that such “protections” actually contain huge loopholes. For example, a good deal of Palisades nuclear power plant property – including much of the forested dunes – almost certainly is more than 600 feet from Lake Michigan. Thus, even such “protections” could still allow for overlooking or ignoring burial sites during construction projects. The nuclear companies state repeatedly throughout the Environmental Report that “NMC does not plan to undertake any major refurbishment activities,” an admission that itself has dire implications, given the deteriorated state of the reactor and its safety systems. But then again, Consumers never envisioned in the early 1970s that it would need to install dozens of 20 foot tall, 132 ton concrete and steel silos to store high-level radioactive waste just 150 yards from the waters of Lake Michigan. And yet, 20 years later, that is exactly what they did. So who knows, really, what projects the companies will need or want to perform on the site over the course of the next 20 years?

In addition to the ever growing stockpile of high-level radioactive waste stored on-site, in 2008 the so-called “low” level radioactive waste dump where Palisades has sent large quantities of atomic trash for decades will no longer accept such wastes from Palisades. It is very possible that Palisades would thus expand on-site “storage” for “low” level radioactive wastes, as well, some of which is actually intensely radioactive, despite the euphemistic name. Lastly, NMC and Consumers state in the last paragraph of their letter that it, and a copy of the response to it from the Michigan Historic Preservation Office, would be included in the Environmental Report. No such response is included. It is disconcerting, given the dearth of supporting documentation (Consumers Power Company’s 1979 “Terrestrial Ecological Survey – Palisades Plant Site” is referenced in the Environmental Report, but a copy of this survey –

seemingly the only actual site survey ever conducted, or at least mentioned in the Environmental Report or documents provided by MSHPO, is not included).

Brian D. Conway of the State of Michigan Historic Preservation Office wrote a letter on March 14, 2005 to James Holthaus at Palisades Nuclear Power Plant stating "...we have reviewed your comments and concur with the recommendations outlined in your [Feb. 11, 2005] letter...". This begs the question, who dropped the ball? NMC/Consumers, or MSHPO? Or both? It's encouraging that MSHPO has expressed concerns, apparently, in the past. But it's discouraging that NRC-imposed deadlines such as the August 8<sup>th</sup> deadline for intervening/requesting hearings and the August 22<sup>nd</sup> deadline for environmental scoping comments have come and gone, with no action regarding the potential for Native American impacts from this proposal being adequately addressed by the companies nor by the federal or state agencies.

Given the sovereignty of these tribes and bands, and the treaty rights that exist between them and the United States federal government, the NRC has a government-to-government responsibility to meaningfully consult with these tribes and bands on such significant federal actions as granting the Palisades reactor an additional 20 years of operations. An independent, comprehensive archaeological survey must be conducted before NRC grants a 20-year license extension to assure that Native American archaeological sites are not negatively impacted by future Palisades reactor operations. Such impacts as harm to lake sturgeon – sacred to some Great Lakes tribes – must also be evaluated. It is interesting and telling that NMC's Environmental Report assigns no "importance" to lake sturgeon (in Table 2.3-1, Page 2-47), despite its State of Michigan "threatened" status, and its sacred status in the cultures and traditions of various Great Lakes Native American Tribes, and its importance to the natural history of Lake Michigan as an ancient indigenous species in the

ecosystem. This is an indication that NMC/Consumers is not acknowledging or addressing environmental justice impacts of 20 more years of operations at Palisades on Native Americans.

Quite recently, a Native American cultural site came to the attention of local tribal officials who did not know about it before. An August 12, 2005 article in the Grand Rapids Press (“Sense of adventure: Historic sites will highlight a new Black River paddling pathway”) had an accompanying map showing a Native American site of historical significance southeast of South Haven on the Black River, just south of 12<sup>th</sup> Street, east of M-43, and west of 66<sup>th</sup> Street/County Road 687. This is well within the ten mile zone from the Palisades reactor, perhaps even within seven miles. Dave Lemberg, director of the Great Lakes Center for Maritime Studies at Western Michigan University in Kalamazoo, played an important role in selecting the historic sites that would be featured along the water trail for canoes and kayakers described in the article. He and other historical and archaeological experts – but most importantly tribal officials and traditional elders – must be meaningfully consulted to ensure an independent site survey at and around Palisades to protect Native American cultural resources there.

The NRC Staff, in its challenge to this contention, inexplicably ignores Petitioners’ arguments about the potential for disproportionately high adverse impacts on Native American cultural resources on the Palisades site that have never been identified.

Tom Goldtooth, executive director of Indigenous Environmental Network in Minnesota, and Winona LaDuke, executive director of Honor the Earth, are long-time advisors to NIRS on such matters and can serve as expert witnesses on these Native American environmental justice contentions.

Technical perfection is not an essential element of contention pleading. *Private Fuel*

*Storage, L.L.C.* (Independent Spent Fuel Storage Installation), LBP-01-3, 53 NRC 84, 99 (2001). The sounder practice is to decide issues on their merits, not to avoid them on technicalities. *Consumers Power Company* (Palisades Nuclear Plant), LBP-79-20, 10 NRC 108, 116117 (1979).

### **WITHDRAWN CONTENTIONS**

Petitioners hereby give notice of the withdrawal of the following contentions from consideration:

Contention No. 5 (no permanent repository for the nuclear waste which would be generated at Palisades after 2010)

Contention No. 6 (Intensifying sand erosion and avalanche risk around dry cask storage pads)

Contention No. 8<sup>28</sup> (Increased embrittlement of re-used fuel rods as buffers to reduce embrittlement of RPV walls)<sup>29</sup>

Contention No. 9 (Chronic emergency unpreparedness within EPZ)

Contention No. 10 (Economic damage in Palisades region in event of accident or attack on the power plant causing severe radiation release)

Contention No. 11 (Threats of terrorist attack and sabotage against the Palisades nuclear power plant)

Respectfully submitted for the Petitioners,

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<sup>28</sup>This Contention was mislabeled as No. 8 in the original Petition inasmuch as there was a separate Contention also numbered 6, but for consistency of reference is defined in this section as being No. 8.

<sup>29</sup>This Contention is being withdrawn in the belief that the gravamen of it can be addressed within Contention No. 1 raised by the Petitioners, "The license renewal application is untimely and incomplete for failure to address the continuing crisis of embrittlement."

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
NUCLEAR MANAGEMENT	)	Docket No. 50-255-LR
COMPANY, LLC	)	
	)	
(Palisades Nuclear Plant)	)	ASLBP No. 05-842-03-LR

CERTIFICATE OF SERVICE

I hereby certify that copies of the "PETITIONERS' COMBINED REPLY TO NRC STAFF AND NUCLEAR MANAGEMENT COMPANY ANSWERS" in the above-captioned proceeding have been served on the following through deposit in the NRC's internal mail system, with copies by electronic mail, as indicated by an asterisk, by U.S. mail, first class, as indicated by double asterisk, with copies by electronic mail, or by U.S. mail, first class, as indicated by triple asterisk, and that paper copies only of "PETITIONERS' APPENDIX OF EVIDENCE IN SUPPORT OF CONTENTIONS" were delivered all parties at the following mailing addresses; all on this 16th day of September, 2005:

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