



Citizens and Scientists for Environmental Solutions

To: Dyer, NRR  
Ref. G20030545

Union of  
Concerned  
Scientists

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September 22, 2003

William D. Travers, Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT: SUPPLEMENT TO INDIAN POINT ENERGY CENTER – PETITION PURSUANT TO  
10 CFR 2.206 – PWR CONTAINMENT SUMP FAILURE**

Dear Dr. Travers:

On September 8, 2003, Riverkeeper, Inc. and the Union of Concerned Scientists (UCS) petitioned the Nuclear Regulatory Commission (NRC) pursuant to §2.206 of Title 10 of the Code of Federal Regulations to take enforcement action against Entergy Nuclear Northeast (Entergy) with respect to the Indian Point Energy Center. The purpose of this letter is to supplement our petition with additional information for the public meeting rescheduled for September 24, 2003.<sup>1</sup>

The petitioners have had numerous contacts in person, by phone, and via e-mail with NRC staffers, industry representatives, and industry consultants since we filed our petition. We posed the following question to virtually all these contacts:

**In your opinion, will Entergy be able to provide sufficient analysis to leave the Indian Point configuration as-is or will physical modifications (e.g, replacement of insulation and coatings with less vulnerable materials and/or modification to the containment sump screens to make them large or provide them with backwashing) be necessary to resolve Generic Safety Issue No. 191 (GSI-191) at Indian Point?**

No one answered our question with the belief that the existing configuration at Indian Point will be acceptable. The consensus of our sample group – albeit small in number but large in awareness – is that Entergy will have to make physical modifications at Indian Point to resolve GSI-191.

If the reasonably expected outcome of GSI-191 for Indian Point involves physical modifications, what and where is the justification for continued operation of the facility absent those fixes? The petitioners are not aware of any evaluation/analysis prepared by Entergy per the requirements of 10 CFR 50.59 or the guidance of NRC Generic Letter 91-18 Supplement 1 or Part 9900 to the NRC Inspection Manual (Notices of Enforcement Discretion).

<sup>1</sup> The petitioners gratefully acknowledge the patience and perseverance of NRC Petition Manager Brian Benney for rescheduling this public meeting from Monday, September 22, 2003, to Wednesday, September 24, 2003. Tropical storm Isabel disrupted the petitioners' preparation for the public meeting and made the initial meeting time untenable for us. We appreciate this indulgence and reciprocate by providing the NRC with this supplement in advance of the rescheduled meeting.

If the reasonably expected outcome of GSI-191 for Indian Point involves analysis concluding that the existing configuration is acceptable as-is, what and where is the preliminary assessment or engineering judgment suggesting that such an outcome is credible? The petitioners have only seen rumor, supposition, and conjecture by Entergy spokespersons.

If the reasonably expected outcome of GSI-191 for Indian Point is indeterminate at this time due to uncertainties, what and where is the technical basis for over-riding the Los Alamos work concluding that Indian Point is highly vulnerable to containment sump clogging? At the very least, the Los Alamos studies seriously challenge the reasonable assurance/adequate protection standard used by NRC to allow nuclear power reactors to operate – serious challenges that, thus far, have been refuted only by rhetoric and vague, unsubstantiated reassurances.

Since submitting our petition, we have read statements in the media by NRC and Entergy representatives. We have carefully considered these statements to see if they affect the basis for our concerns. These statements do not persuade us. In fact, our research into these statements only heightened and refined our concerns. The following is a listing of these statements in a point (NRC/industry) and counterpoint (petitioners) format:

POINT	COUNTERPOINT
<p>No PWR containment sump has yet been challenged in 2000-plus years of reactor operation, therefore the time planned to resolve GSI-191 is not inappropriate.</p>	<p>Table F-10 in Appendix F to NRC letter dated July 31, 2003, from Ashok C. Thadani to Samuel J. Collins, "Transmittal of Technical Work to Support Possible Rulemaking on a Risk-Informed Alternative to 10 CFR 50.46/GDC 35," listed the mean frequencies for small-break, medium-break, and large-break loss of coolant accidents (LOCAs) as <math>1.5 \times 10^{-3}</math>, <math>6.1 \times 10^{-5}</math>, and <math>7.2 \times 10^{-6}</math> per reactor-year respectively. These initiating event frequencies correspond to approximately 5 small-break LOCA events, 0.2 medium-break LOCA events, and 0.025 large-break LOCA events in the 3,362 reactor years of PWR experience considered in deriving the frequencies. The absence of past events does not guarantee continued absence in the future.</p> <p>The March 1979 accident at Three Mile Island was a small-break LOCA where considerable reactor cooling water was deposited on the containment floor. The poorly trained operators at Three Mile Island had little awareness of what was going on at the plant and therefore did not manually initiate the recirculation system. Instead, they allowed the reactor core to be uncovered and partially melt down. Had they been better trained and provided with better emergency response procedures, the TMI accident might have recorded a challenge to the PWR containment sump function.</p> <p>In addition, the upper 95% bound frequencies for small-break, medium-break, and large-break LOCAs were reported as <math>4.0 \times 10^{-3}</math>, <math>2.3 \times 10^{-4}</math>, and <math>2.7 \times 10^{-5}</math> per reactor-year respectively. Coupled with the very high likelihood (e.g., 90 to 99.9%) of</p>

POINT	COUNTERPOINT
	<p>containment sump failure calculated by Los Alamos given a LOCA at Indian Point, these initiating event frequencies yield core damage frequencies outside the acceptable range specified in Regulatory Guide 1.174 for continued reactor operation under the adequate protection standard.</p> <p>Finally, the hazard was deemed sufficiently credible for the NRC to issue Bulletin 2003-01 in June 2003. The petitioners cannot understand how a threat can be real enough for the NRC to urge Entergy to formally consider interim compensatory measures to protect against containment sump clogging, but not real enough for the NRC to require Entergy to expeditiously fix the containment sump problem.</p>
<p>Walk-downs inside containment are routinely conducted that will identify and cause the removal of any potential debris sources, thereby minimizing the chances for clogging the containment sump screens.</p>	<p>These walk-downs serve a valuable function and should be continued by all means. However, the overwhelming majority of the debris loading the containment sump screens in the Los Alamos studies was created during the postulated accidents from piping insulation and equipment coatings dislodged by the force of the fluid escaping through the broken pipes. The walk-downs provide negligible protection against accident-generated debris, which is the primary hazard.</p>
<p>There will be sufficient indication of impending problems, per the leak-before-break theory, for the operators to take actions to minimize the consequences of pipe breaking.</p>	<p>Figure F-9 in Appendix F to NRC letter dated July 31, 2003, from Ashok C. Thadani to Samuel J. Collins, "Transmittal of Technical Work to Support Possible Rulemaking on a Risk-Informed Alternative to 10 CFR 50.46/GDC 35," listed the mean expectations by an expert panel for detecting leakage before break as 50% for a surge line break, 60% for a hot leg break, and 55% for an RHR or low pressure injection line break. Page F-29 of the cited letter stated "The implication is that 50% of all failures, on average, are expected not to exhibit a detected precursor event." Obviously, the 50-50 warning odds are reduced when the leakage detection equipment is not maintained in optimum condition. Entergy is presently under no obligation to maintain this monitoring equipment at or near peak performance. The petitioners seek to reach at least the 50% chance of warning through an NRC order requiring Entergy to maintain the leakage detection equipment in optimum shape while the reactors are operating with GSI-191 unresolved.</p>
<p>The Los Alamos results were derived using very conservative assumptions and generic data that may not be explicitly applicable to Indian Point.</p>	<p>As cited in our September 8<sup>th</sup> petition, the petitioners stipulate that the nature of the safety hazard at Indian Point has not yet been quantified to anything approaching two-digit precision. However, the known safety hazard today is not less severe or more uncertain than the safety hazard that</p>

POINT	COUNTERPOINT
	<p data-bbox="819 285 1409 346">prompted the voluntary shut down of both reactors at D C Cook in September 1997.</p> <p data-bbox="819 380 1409 506">Nor is the Indian Point safety hazard less severe or more uncertain that the safety hazards that prompted the NRC to order the following reactor shutdowns:</p> <ul data-bbox="868 512 1424 938" style="list-style-type: none"> <li data-bbox="868 512 1424 608">• Pilgrim in December 1973 due to concerns about fuel channel box wear (NECNP &amp; UCS petition),</li> <li data-bbox="868 614 1424 676">• Cook Unit 1 in spring 1978 due to concerns about electrical connectors (UCS petition),</li> <li data-bbox="868 683 1424 868">• Beaver Valley Unit 1, Surry Units 1&amp;2, FitzPatrick, and Maine Yankee in March 1979 – days before the Three Mile Island accident – due to concerns about errors used in computer codes used in seismic design analyses, and</li> <li data-bbox="868 874 1424 938">• Peach Bottom Units 2&amp;3 in March 1987 for concerns about operator attentiveness.</li> </ul> <p data-bbox="819 974 1409 1066">Thus, the danger is as clear and as present at Indian Point as it was at these reactors so the NRC must take the same remedy.</p>

Mathematically, the containment sump issue at Indian Point can be expressed as:

$$\text{Reactor Risk} = (\text{Probability of Initiating Event}) * (\text{Probability of Mitigating System Failure}) * \text{Time}$$

The “Probability of Initiating Event” term is the likelihood that a loss of coolant accident occurs.

The “Probability of Mitigating System Failure” term is the likelihood that the safety systems installed at Indian Point to prevent the reactor core from damage caused by overheating are unable to successfully perform this function.

The “Time” term is simply the period that the Indian Point reactors operate until GSI-191 is resolved.

The petitioners sought to responsibly manage the reactor risk at the Indian Point Energy Center by tangible measures to lower all three terms in the risk equation:

1. The primary requested enforcement action – immediate reactor shutdown and cessation of operation until such time that GSI-191 is resolved – minimizes both the “Time” and “Probability of Mitigating System Failure” terms. Because the “Probability of Initiating Event” term remains unchanged, this enforcement action reduces risk.
2. The secondary requested enforcement action – resolution of GSI-191 at the next scheduled refueling outages coupled with no actions that might increase the likelihood of a LOCA and measures to ensure optimum leak-before-break monitoring capability – prevents the “Probability of Initiating Event” term from increasing and lowers the “Time” term. Because the “Probability of Mitigating System Failure” term remains unchanged, this enforcement action reduces risk.

Compare and contrast the petitioners' requested actions to the measures taken and not taken by NRC. The NRC issued Bulletin 2003-01 in June 2003 asking plant owners to consider measures to lessen the chances that containment sump screens will clog with debris in event of a LOCA and measures to provide other sources of cooling water to the reactor core if the screens clog. At most, this measure slightly lowers the "Probability of Mitigating System Failure" term. Because it allows the Indian Point reactors to continue operating indefinitely (i.e., the "Time" term increases), this negligible risk reduction is more than offset by the risk increase.

The NRC has knowingly allowed reactors to operate with increased likelihood of a LOCA. For example, when the NRC held its now infamous 11-3 "unanimous" vote on November 28, 2001, to allow Davis-Besse to continue operating with high likelihood – almost certainty – of cracked and leaking control rod drive mechanism nozzles, it did so with absolutely no regard for the concurrent high likelihood of mitigating system impairment. The NRC had no excuse for overlooking it. GSI-191 was opened by the NRC in September 1996 and should have been a factor in the regulatory decision-making process. But it was not and the NRC allowed Davis-Besse to operate for an extended period both with an increased likelihood of a LOCA and an increased likelihood of mitigating system failure. By letting all three terms in the risk equation increase, the NRC exposed people around Davis-Besse to elevated risk.

The petitioners seek to eliminate the NRC's "tunnel-vision" and prevent future actions that increase the likelihood of a loss of coolant accident at Indian Point when the probability of mitigating system failure is unnecessarily high.

If the NRC denies our petition in its entirety – in other words, opts not to take either of the two requested enforcement actions – it will be reducing risk management to a single factor, the probability of an initiating event. The public will be, in essence, protected from a loss of coolant accident *unless a loss of coolant accident happens*.

Suppose the NRC denies our petition in its entirety and Entergy enlargens the containment sump screens and/or replaces insulation/coatings inside containment at Indian Point in 2005, or 2007, or 2008, or 2013, or whenever. Won't those modifications be *prima facie* evidence of regulatory malpractice? Yes. Won't they be proof positive that the public health hazard was both real and really ignored by the NRC? Yes. Will the petitioners fail to remind people? No.

Everything that the petitioners have read, seen, and heard strongly suggests that the existing containment sump screens at the Indian Point Energy Center cannot provide reasonable assurance against clogging by the debris generated during design basis loss of coolant accidents. Therefore, the petitioners reaffirm the call for the enforcement actions requested in our September 8<sup>th</sup> petition.

If there are any questions, please contact David Lochbaum at (202) 223-6133.

Sincerely,

<ORIGINAL SIGNED BY>

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