

September 4, 2014

Dear Elected Official:

My name is Gary Shaw and I am a member of the Leadership Council of the Indian Point Safe Energy Coalition (IPSEC). I have been an activated stakeholder since February 2000 when Indian Point 2 had a steam pipe rupture that resulted in venting radioactive steam just a few miles from my home.

On June 4, 2014 the Nuclear Regulatory Commission held its Annual Assessment of Indian Point Meeting at Colonial Terrace in Cortlandt Manor, NY. This is the one public meeting that is held annually. I spoke at that meeting and asked questions related to Seismic Safety, protocols for their Probabilistic Risk Assessments (PRAs) and Spent Fuel Storage. I submitted my statements and questions in writing to all NRC officials in attendance.

Six weeks later I received a response from NRC by Mr. Arthur L Burritt, Chief, Projects Branch 2, Division of Reactor Projects.

I felt that some answers were inadequate and some of the information that he divulged made me quite concerned and I had follow-up questions. Enclosed is my response to Mr. Burritt's letter. I have appended the written public statements and questions that I submitted at the June 4 meeting and Mr. Burritt's response to provide context.

I hope that you will read this material and take it under consideration.

I will be happy to respond to any questions you might have.

Thank you for your time and consideration,

Sincerely,

A handwritten signature in black ink that reads "Gary Shaw". The signature is written in a cursive, flowing style.

Gary Shaw  
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Croton on Hudson, NY 10520  
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REC-610909-14-00723

September 3, 2014

Arthur L. Burritt, Chief  
Projects Branch 2  
Division of Reactor Projects  
US NRC Region 1  
2100 Renaissance Blvd. – Suite 100  
King of Prussia, PA 19406

Dear Mr. Burritt:

I appreciate that NRC deigned to respond to the questions I presented in writing at the June 4 Annual Assessment public meeting. Apparently my questions were too broadly phrased, and consequently your responses are largely inadequate or evasive. I have appended the statements and questions I presented at the June 4 meeting as well as your responses so there is full disclosure. As you can see from the cc list below, I want my statements and questions from that meeting and my response to your letter to be widely disseminated to your agency management, to elected officials with interests in these issues, to members of the media who cover energy issues and to other watchdog organizations and stakeholders in reactor communities other than Indian Point.

I have rephrased some of my questions in language that largely requires only yes or no answers and based on the information you provided I have follow-up questions.. I would hope that you would make your responses to these follow-up questions available to elected officials and others on the cc list so there is transparency from both sides of this “conversation.” If not, interested parties can contact me directly and I will be happy to make copies or pdf files and forward them forthwith, assuming I receive responses from you or someone else at NRC.

**Regarding seismic safety:**

In your letter you state, “Ground motion depends not only on an earthquake’s magnitude, but also on its distance from the site and geological characteristics of materials (density, saturation, elasticity and energy damping properties) through which the energy waves travel.” Since we have always been told that Indian Point is built on bedrock, I assume that it has high density and little elasticity or energy damping properties. So given these data, my questions are:

1. Since your letter said that Indian Point building structures including containment and spent fuel storage were built to withstand .15g and NRC reports that the August 2011, 5.8 magnitude earthquake in Virginia produced forces of .26g, would that g force level also exceed the design basis and operating basis of both Indian Point NPPs? (yes or no is sufficient)
2. Would it be reasonable to assume that the epicenter of an earthquake near Indian Point could be at the intersection of the Ramapo fault and Stamford to Peekskill fault which is about one mile from Indian Point 3? (yes or no is sufficient)
3. Would it be a reasonable assumption that since the epicenter of the 5.8 Virginia earthquake was 11 miles from the North Anna plant, that a seismic event of 5.8 emanating from that intersection of the two

faults one mile from Indian Point 3 would likely produce g-force acceleration beyond that at North Anna since the epicenter would be ten miles closer? (yes or no is sufficient)

4. Since the seismologists at Lamont Doherty Earth Observatory estimate the potential for as much as a 7.0 seismic event from that intersection of the Ramapo and Stamford to Peekskill faults, would NRC acknowledge that the .15g standard for which Indian Point was designed is *potentially inadequate* to ensure plant integrity? (yes or no is sufficient)
5. Given that the North Anna earthquake exceeded the standards established for Indian Point, and given that Indian Point is much closer to the logical epicenter of a seismic event that potentially far exceeds the 5.8 magnitude of the Virginia event, exactly what steps will NRC require of the operator to reinforce both the containment structures and the spent fuel storage structures and all other structures on-site so that an earthquake in the 6.5 – 7.0 range will not cause failures of structures and safety systems at Indian Point?

#### **Regarding the Probabilistic Risk Assessment (PRA):**

Consistent with the approach used by NRC for its GENERIC Environmental Impact Statement on high level radioactive waste storage (Spent Fuel Assemblies), it is clear that NRC is not willing to look at specific nuclear power plants and put each into a context of the externalities of location, confirming for this stakeholder that the overall agency philosophy is to minimize costs for preemption of catastrophic events and because the probability of the unexpected is small, policy decisions by the agency largely reflect a “probably good enough” standard. Using the Surrey plant as the “typical” PWR (Pressurized Water Reactor) disregards that the magnitude of risk at Indian Point is dramatically larger because:

- About 17 million residents live in the 50 mile ingestion zone, and
- About 20 million live or work in that radius of the plant, and
- The US Military Academy at West Point sits approximately 7.5 miles from the plant, and
- A major portion of the New York City water supply comes from the Kensico reservoir which is located about 16 miles from the plant, and
- The financial center of the world, Wall Street, is within 38 miles from the plant.

To this stakeholder, it is disgraceful and dangerous to start every analysis with “it probably won’t happen” and common sense would dictate that when we can see the real life, ongoing radiation release consequences of failure at the Fukushima Daiichi plant, the approach should be that we do everything possible to prevent a catastrophe from occurring. Because of this I believe NRC should use the NPPs that have the largest potential disaster scenarios as the model and scale down as reasonable for NPPs in locations where the NPP is more remote from large populations and critical assets for our country.

#### **Finally, regarding spent fuel storage:**

In your letter you indicate that the wet storage facilities at IP1 and IP 2 were each designed to contain 264 fuel assemblies and that each storage pool currently holds about five times or more (new capacity 1345 – 1374, and both are “near full capacity”) than the number of assemblies for which the pools were designed. As mentioned above, the very fact that the Waste Confidence Generic Environmental Impact Statement uses a surrogate rather than site-specific analyses and the ingoing baseline assumes is that there is low probability of the unexpected occurring, NRC concludes that the ever growing stockpiles of high level wastes will not be a problem even if there is never a national repository for these toxic, mutagenic and deadly radionuclides. From my perspective, NRC’s approach deliberately minimizes the level of risk and consequently endangers public health and safety rather than maximizing preemptive efforts to protect public health and safety.

While you indicate that “the Commission voted against requiring expedited transfer of spent fuel” you fail to mention that the Chairman issued a scathing disagreement with the decision of the other four commissioners. And you fail to note that one of those commissioners has already accepted a position in the industry he is supposed to regulate and should have recused himself from any decision making role. Quite simply, it is clear to this stakeholder that NRC has become an industry defender and enabler and not a responsible player sworn to protect the public.

I look forward to your response.

With all due respect,



Gary Shaw (crotonshaw@aol.com)

Member of the Leadership Council of the Indian Point Safe Energy Coalition

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CC:

Chairman Allison Macfarlane	Paul Gunter – Beyond Nuclear	Michel Lee – IPSEC/nirs
William Dean – NRC Region 1	Michael Mariotte – NIRS	Judy Allen – IPSEC
Neil Sheehan – NRC Region 1	Tim Judson - NIRS	Margo Schepart – IPSEC
Sen. Barbara Boxer	Harvey Wasserman –NukeFree.org	Matthew Wald – NY Times
Sen. Bernie Sanders	Karl Grossman - Journalist	Andrew Revkin – NY Times
Sen. Ron Wyden	Leslie Sullivan Sachs –	Michael Risinit – LoHud
Sen. Edward Markey	Alice Slater – Abolition 2000	Roger Witherspoon – Energy Matters
Rep. Nita Lowey	Paul Gallay – Riverkeeper	Linda Gunter – Beyond Nuclear
Rep. Eliot Engel	Tina Posterli- Riverkeeper	Kevin Kamps –Beyond Nuclear
Rep. Sean Patrick Maloney	Manna Jo Greene – Clearwater	Priscilla Star – Coalition Against Nukes
Assemblyman Tom Abinanti	Jeanne D. Shaw -IPSEC	Phillip Musegaas -Riverkeeper
Town Supervisor Linda Puglisi	Marilyn Elie – IPSEC	Westchester CE Rob Astorino
Cortlandt Town Board	Susan Shapiro - IPSEC	Westchester Bd. Of Legislators
Town Supervisor Paul Feiner	Rockland CE – Ed O’Day	Rockland Bd. Of Legislators
Mayor Leo Wiegman – Croton	Putnam CE – Mary Ellen Odell	Putnam Bd. Of Legislators
Croton on Hudson Village Bd.	Sen. Chuck Schumer	Sen. Kirsten Gillibrand
Gov. Andrew Cuomo		

## STATEMENT AND QUESTIONS FOR NRC ANNUAL ASSESSMENT MEETING

June 4, 2014\_\_Colonial Terrace, Cortlandt Manor. NY

Gary Shaw

9 Van Cortlandt Place

Croton on Hudson, NY 10520

Before asking my questions, I want to take a minute to let Administrator Dean know that this local homeowner and involved stakeholder is extremely disturbed and angered by your arrogance and disregard for transparency by an agency that proves over and over again that it has placed its charter responsibility to the public far behind its promotion and protection of the nuclear industry. That NRC could hire a professional moderator who has virtually no knowledge of the issues while writing to me that a public record of public meetings is not a good use of NRC budget is a slap in the face to all the citizens living in reactor communities and is a cowardly and crass attempt to stifle communications so that relevant issues brought to the front by citizen stakeholders will not be known by other communities nor by upper management of the agency. Shame on you sir.

Now my questions:

First, as I am sure you are aware, in August 2011, a 5.8 magnitude earthquake occurred in Virginia with the epicenter approximately 11 miles from the North Anna nuclear plant. That event was felt in New York City and as far north as Rhode Island. I am also sure you are aware that that earthquake created ground wave vibrations that exceeded both design basis and operating basis for the North Anna plant, cracked structures on site and moved some of the massive, multi-ton dry cask storage units.

I assume you are also aware that the Indian Point Nuclear Plant was built in close proximity to the known Ramapo fault, which is mind boggling to begin with, and that Entergy has stated multiple times that Indian Point was built to withstand a 6.1 magnitude seismic event. In 2008, seismologists of the Lamont Doherty Earth Observatory of Columbia University identified a second fault that intersects the Ramapo Fault within a mile of Indian Point and these seismologists estimate potential for as high as a 7.0 magnitude seismic event. My questions are:

- Can you confirm that Indian Point's reactor buildings are based on seismic tremor levels equated to a 6.1 event?
- Can you tell us what the seismic safety standards are for the spent fuel storage structures where over 2700 tons of high level wastes are stored?
- Can you tell us what level of event your new evaluation standards will be since a 7.0 magnitude event is approximately 10 times the force of a 6.0 event and my understanding is that geological records for earthquake magnitude in this area go back only about 350 years which is a blink in geological terms.
- Can you tell us what steps will be taken to look for smaller, but potentially dangerous levels of damage to things like pipe welds, cracked cement, compromised underground pipes or other internal structures if an earthquake occurs? In other words the seismic issue is not simply that there might be "a big one" – though that is far from a trivial concern. The real threat is that vibrations from a quake can cause unseen, unknown damage to plant internals, weakening piping, fraying wires, loosening welds, creating fissure cracks in some component or another. And everything still looks fine. Then, a year or two or

even ten later, there is a problem at the plant and, instead of working as planned or expected, that weakened part cracks.

- Can you assure the public that the high pressure gas lines of the Algonquin Pipeline that circumvent Indian Point can withstand the size events that are estimated by Lamont Doherty? And since there is a proposal to expand those pipelines to 42 inches, will that affect your seismic safety calculations?

Second, in your probabilistic risk modeling of Severe Accidents, does the NRC include the outside environment and economic data should the unexpected happen? Specifically, does the agency use the same set of criteria for each nuclear plant to determine probabilities of a severe accident based on reactor design and output capacity? In plainer terms, does 20-million people living or working within the 50-mile radius of Indian Point, and the \$8.5 trillion in real estate value alone carry any additional weight in your probabilistic modeling compared to the Wolf Creek Generating Station in Burlington, KS or the Cooper Nuclear Station in Brownville, NE both of which have sparse population and relatively little economic assets within 50-miles? If so can you explain the weighting system?

Finally, since no nuclear plant in the US was ever designed for indefinite storage of nuclear waste, how far above original design basis is currently stored in the spent fuel pools? Since the spent fuel can be moved into dry cask storage after just a few years, and a 2003 report, co-authored by the current NRC Chairman Macfarlane concludes that the spent fuel storage is safer in separated dry casks than the overcrowded wet storage of the pools, why has such a small percentage of eligible fuel assemblies been moved into the safer storage containers.? And exactly how many times above what the pools were designed for is currently stored in the spent fuel pools?

THE FOLLOWING PAGES ARE NRC'S REPLY TO MY ORIGINAL QUESTIONS



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
2100 RENAISSANCE BLVD., SUITE 100  
KING OF PRUSSIA, PA 19406-2713

July 21, 2014

Mr. Gary Shaw  
9 Van Cortlandt Place  
Croton on Hudson, NY 10520

Dear Mr. Shaw:

I am writing in response to your June 4, 2014, letter regarding our Annual Assessment meeting for the Indian Point nuclear power plant. That meeting took place on June 4, 2014, in Cortlandt Manor, N.Y. As the NRC Region I Branch Chief responsible for Indian Point, I served as the coordinator for the meeting. Your letter raises concerns about the ability of Indian Point to withstand a seismic event. Additionally, you questioned the probabilistic risk modeling of severe accidents, the proposed Algonquin pipeline, and the current storage of fuel in the spent fuel pools at Indian Point.

Nuclear plant structures, systems, and components important to safety must be designed to safely withstand the effects of natural phenomena, such as earthquakes, without loss of capability to perform their safety function. The vibratory ground motion for which these structures, systems, and components must be designed to remain functional is the plant's safe shutdown earthquake (SSE). The NRC requires that if the SSE ground motion occurs, these structures, systems, and components must be able to withstand the effects and assure the plant's capability to shut down the reactor and maintain it in a safe-shutdown condition. For any seismic ground motion felt onsite, licensee procedures require walkdowns to be conducted to verify that plant components and structures, including the spent fuel pool, are capable to perform their intended functions. If the SSE is exceeded, as was the case in the August 2011 Virginia earthquake near North Anna Nuclear Power Station, NRC regulations require that the station not start up until it can demonstrate that no functional damage occurred to those features needed for continued safe operation.

The ability of a nuclear plant to withstand certain levels of ground motion is measured in accelerations (g's), not the Richter scale. Ground motion depends not only on an earthquake's magnitude, but also on its distance from the site and geological characteristics of materials (density, saturation, elasticity, and energy damping properties) through which the energy waves travel. The ground acceleration used for the design of Indian Point Units 2 and 3 safety-related structures, including the spent fuel pool, is 0.15g. As part of the NRC's post-Fukushima actions, each plant was required to perform a seismic hazard reevaluation. We are currently in the process of reviewing those reevaluations. Indian Point has been prioritized as a Tier 1 plant, which means the results of its reevaluation qualify it for the most immediate attention. The NRC's request for information to licensees for seismic hazard reevaluations can be found using the NRC's web-based Agencywide Documents Access and Management System (ADAMS). To retrieve the document, enter the Accession Number ML14030A046 in the Document Properties field located in the Advanced Search tab at the following webpage: <http://adams.nrc.gov/wba/>.

Entergy submitted seismic reevaluations for Indian Point Unit 2 (ML14099A110) and Unit 3 (ML14099A111) on March 31, 2014. The plants can continue to operate until these reviews are

complete because their robust designs and redundant safety features ensure they can safely shut down during the largest postulated seismic event. Since plants generally have significant margin beyond their existing seismic design basis, it is possible they can continue to operate safely without modification even with a higher seismic hazard. No decisions have been made yet with respect to whether any structures at Indian Point will have to be modified or reinforced.

The NRC uses probabilistic risk analysis (PRA) to quantify risk and identify what could have the most impact on safety. We employ a number of methods in performing PRAs in our "risk-informed" approach to regulation. More information on the NRC's use of PRAs can be found at the following webpage: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/probabilistic-risk-asses.html>.

Regarding the potential impacts on the public should an event occur, please see the NRC's State-of-the-Art Reactor Consequence Analyses (SOARCA) project, which is designed to develop realistic estimates of the potential public health effects resulting from a nuclear power plant accident: <http://www.nrc.gov/about-nrc/regulatory/research/soar/faqs.html>.

Regarding your question of Indian Point's current spent fuel storage amounts, anytime a plant's owner intends to increase the capacity of its spent fuel pool beyond the licensed amount, a thorough evaluation must be conducted to ensure the continued safe storage of the material, including a review of the increased heat load and an analysis of any increased potential for safety hazards. In the case of Indian Point, this took place each time they changed the configuration of the spent fuel pools, providing assurance that the pools remained safe. The NRC independently reviewed each of the spent fuel pool evaluations and concluded that the spent fuel pools remain safe under the licensed loading limit. Both Indian Point Unit 2 and 3 were originally licensed for a maximum capacity of 264 fuel assemblies. Since then, analyses and evaluations have proven that the pool can safely accommodate more than the original licensed limit. Currently, the Unit 2 spent fuel pool has a capacity of 1374 assemblies, and the Unit 3 spent fuel pool has a capacity of 1345 assemblies. Both pools are similarly loaded near full capacity. Entergy has also been granted license amendments to allow spent fuel transfer from the Unit 3 spent fuel pool to the Unit 2 spent fuel pool using a newly designed transfer cask. The NRC has performed a significant amount of inspection regarding this fuel transfer to verify that it is executed safely (ML13039A047).

Regarding your reference to a 2003 report co-authored by NRC Chairman Macfarlane on the topic of dry cask storage, the NRC Chairman, along with the other four members of the Commission that oversees NRC policy and decision-making, recently articulated their views on requiring the expedited transfer of spent fuel to dry cask storage. Each Commissioner decides these matters based on his or her own careful evaluation. Ultimately, the Commission voted against requiring expedited transfer of the spent fuel. To review each Commissioner's voting record and basis for their decision, visit the following link at the NRC website: <http://www.nrc.gov/reading-rm/doc-collections/commission/comm-secy/2013/2013-0030comvtr.pdf>.



G. Shaw

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Regarding your question about the Algonquin Pipeline and the ability of Indian Point to withstand an event (pipeline rupture) considering a proposal to build an additional gas line thorough the Indian Point property, the Federal Energy Regulatory Commission (FERC) defines the standards and quality assurance measures for gas pipeline construction. Indian Point is required to ensure the plant can withstand any hazard the pipeline may introduce to structures, systems, or components important to safety. This may require Indian Point to perform modifications to the plant, which could require prior NRC review and approval.

Thank you for your questions regarding Indian Point nuclear power plant. I hope this response addresses your concerns.

Sincerely,

A handwritten signature in black ink, appearing to read 'Arthur L. Burritt', with a long horizontal flourish extending to the right.

Arthur L. Burritt, Chief  
Projects Branch 2  
Division of Reactor Projects