

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

My name is Bruce Skud, co-founder of No More Fukushimas, a grassroots citizens group focused on public safety at the Seabrook plant.¹ We thank Nuclear Regulatory Commission (NRC) Region 1 for convening this public meeting.

Due to serious and largely intractable problems affecting public safety, No More Fukushimas urges the NRC *to set aside* the relicensing process for the Seabrook plant and *shut down* the facility. Our call for a shutdown is based on two primary criticisms:

- First, NextEra's study of concrete degradation at Seabrook is invalid.
- Second, the NRC's claim that the plant can be operated safely, even in the short-term, is unfounded.

Our General Concerns about NextEra's Study

Before discussing our two primary criticisms, we want to set forth our *general* concerns about the alkali-silica reaction (ASR) study. NextEra is footing the bill for Dr. Bayrak's multi-million-dollar study. The company stands to lose an enormous amount of money if he determines major plant modifications will be required. With no disrespect meant to Dr. Bayrak, we contend that a study funded by the plant owners does not give the public the assurance of impartiality.

Any serious corrective action at the plant will be incredibly costly. The simple truth is that there is no known technological fix that will counteract ASR degradation or arrest its progression.

¹No More Fukushimas is a grassroots organization of citizens who live and work near the Seabrook nuclear power plant, primarily in Massachusetts. We focus on public safety rather than the debate over nuclear power. No More Fukushimas was founded by Bruce Skud (Newburyport) and Joanna Hammond (Amesbury).

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

As farfetched as it may sound, we have been told that NextEra has even considered digging a huge trench around the plant and installing massive steel panels to hold the foundation together. NextEra must be *praying* that Dr. Bayrak will determine that no major modifications will be needed.

Aside from NextEra's stake, we worry that the NRC lacks the expertise to oversee this study. *ASR is outside of the range of expertise of NRC staff.* ASR is a novel problem for the NRC because Seabrook is the first and *only* US nuclear plant afflicted by ASR.² The NRC understandably knew little about ASR when it was discovered at Seabrook, but it has allowed the plant to operate anyway for three years—risking public safety.

Since then, the NRC should have become informed enough to know that there are too many unknowns about ASR degradation to completely assure the public of the plant's safety. But, this agency has failed to do the right thing, which is shut down the plant immediately. The continued operation of the Seabrook plant means more to the NRC than ensuring public safety.

*Region 1: The public does not condone your decision to allow the continued operation of this risky plant.*³

No one would blame the NRC if it would have simply acknowledged its ignorance and requested that a distinguished independent organization, such as the National Academy of Science, review NextEra's study proposal. The Academy could have assembled a team of highly respected scientists with meaningful ASR expertise.

Instead, the NRC has forged ahead—in lockstep with NextEra—by approving a long-term study that is fatally flawed and will provide no meaningful results.

²ASR has been a known phenomenon for decades in other sectors using concrete structures, such as the transportation sector.

³It is emblematic of our concern that the Regional Administrator has not attended a single NRC public meeting involving the Seabrook plant, even though the Region 1 has labeled the plant "degraded."

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

NextEra's ASR Study is Fatally Flawed

We will now delve into our specific concerns about NextEra's fatally-flawed study.

Typically, for a study such as this, the NRC would prefer that the "original concrete"—composed of the actual aggregate used in Seabrook's concrete—be tested at the plant under actual conditions. However, NextEra claimed that if an ASR-affected sample were removed, the sample would lose the strength provided by steel rebar embedded in the concrete and, therefore, would not provide accurate test data.

So, NextEra decided that it would be preferable to fabricate test samples that *supposedly* would replicate the ASR-affected aggregate. NextEra claimed that *replica* test samples were needed because the *original* aggregate used in the plant is no longer "accessible" from the source, a quarry in Maine.

NextEra's reasoning defies credulity. Just because the exact aggregate is inaccessible does not mean that accurate test results can be obtained from replica aggregate. Replica aggregate is just that, a replica, and incorrect test data from it affects the safety of at least 200,000 people.

Given these study parameters, the NRC should have rejected NextEra's proposal at the outset because approximation is not sufficient. However, Region 1 cannot seem to grasp that the goal should not be to assure the plant's continued operation—it should be to assure public safety.

As a substitute for the original aggregate, Dr. Bayrak is fabricating samples from a far-flung menu of sources. He started the mixture with "super-reactive" aggregate from New Mexico to speed up the test timeframe. He then mixed in aggregate from a different quarry in Maine, and sprinkled in sodium hydroxide as a booster. As the NRC should know, this concoction does not truly replicate the peculiar properties of the aggregate from the original quarry. At the end of the

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

day, the replica sample will only inform us about how ASR progresses with this *concoction*.

This study has *already* begun to implode; the so-called “delays” are telling. For instance, to simulate temperature and humidity conditions, Dr. Bayrak’s assistants set up greenhouses in tents with sprinklers to foster the progression of ASR in the fabricated samples. The ASR at Seabrook has progressed very slowly since plant construction, 30-some years ago, but NextEra wants to complete the study in a shortened timespan.

The ASR in the study is progressing more slowly than expected, which speaks volumes. We should note that testing is being conducted at a University of Texas lab, not under the exact Seabrook site conditions, or even in the environment of coastal New Hampshire.

Initially, Dr. Bayrak projected that the NextEra study would be a two-year study, completed in 2014. Now, the study has been extended until 2015, and may extend beyond that.

We don’t know whether to laugh or cry about a study that draws on a New Mexico aggregate tested in a Texas laboratory to simulate a Maine aggregate under conditions in New Hampshire.

To recap, the study (1) does not use the original aggregate, (2) unsuccessfully simulates conditions, and (3) compresses the passage of time. In considering all of this, how is it possible to expect credible conclusions?

To put all this into perspective, let’s review the extent of the ASR problem at Seabrook:

- ASR affects the plant’s *entire concrete foundation wherever it comes into contact with water and has been detected in 131 locations*.
- Alarmingly, ASR already plagues five NRC-designated “safety” structures. These include the reactor’s containment building and a tunnel that houses

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

electrical conduit that feeds the cooling system needed in case there is a meltdown.

- Humidity and rain have already fostered ASR on external walls, as well as below-grade locations.

The severe ASR problems at Seabrook are exacerbated by other monumental problems. Among the most prominent: sea-level rise. Stanford University researchers recently projected that flooding due to sea-level rise and storm surges is likely to occur during 2030-2050, the period for which Seabrook has applied for a license extension.⁴ In fact, they determined that the Seabrook plant is the third most vulnerable nuclear plant site in the United States to such flooding. You do not have to be an ASR expert to realize this surface water infiltration rise will accelerate the foundation's susceptibility to ASR.

The Portsmouth-based Seacoast Anti-Pollution League (SAPL) has raised the flooding issue repeatedly in NRC public meetings. However, Region 1 continually ignores the warnings of advocacy groups and the Stanford researchers. The potential flooding problem must be incorporated into any long-term reliability study for the results to be credible.

No More Fukushimas' critique of the ASR study is only *the tip of the iceberg*. A more-detailed discussion of the study's flaws is presented in a November 4, 2013, letter to the NRC from the Union of Concerned Scientists and the C-10 Research & Education Foundation.⁵ It's mandatory reading. We say, "*Read it and weep for public safety!*"

⁴See article in the *Washington Post* http://articles.washingtonpost.com/2012-10-31/opinions/35499436_1_fukushima-daiichi-nuclear-plants-seabrook-plant.

⁵The Union of Concerned Scientists and C-10 letter can be found at http://www.ucsusa.org/assets/documents/nuclear_power/Seabrook-Concrete-Commissioner-letter.pdf.

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

The NRC's Claim that Seabrook Can Safely Operate in the Short Term is Unfounded

We will now shift to our second concern, the NRC's claim that Seabrook can be safely operated in the short-term.

No More Fukushimas *categorically rejects* the NRC's claim that the Seabrook plant can continue to operate safely, even on a short-term basis. Importantly, our conclusion is based *strictly* on information and criteria provided by NRC staff and in NRC documents.

The NRC's claim that the plant is operable hinges on the notion that the rebar embedded in the concrete has experienced no adverse reactions due to ASR. The NRC contends that no matter how much micro-cracking caused by ASR may have degraded the concrete, the foundation is adequately strengthened by rebar. If the rebar is weakened also, however, then this pivotal argument fails.

In fact, an NRC official has stated that the rebar has already been adversely impacted by ASR. Specifically, an engineering branch chief of the Division of Reactor Safety—a 25-year NRC veteran and nuclear engineer—testified to this fact before the NRC's Advisory Committee on Reactor Safeguards in July 2013.⁶ We think it is worth quoting from the meeting's transcript:⁷

“[There is] ASR expansion in the wall... It's straining the rebar. ..We believe that the ... ASR is actually spanning throughout the wall and it's causing the rebar to bow and that's manifesting itself with strain on the surface.”

This statement does not jibe with Region 1's claim that the rebar have not been adversely affected by ASR.

Bowing is not the same as rebar corrosion, but bowing—even a very small amount of bowing—could break down the two-to-three-inch concrete layers that

⁶NRC, Advisory Committee on Reactor Safeguards Plant Operations and Fire Protection, July 24, 2013, which can be found on the NRC website at <http://pbadupws.nrc.gov/docs/ML1325/ML13254A272.pdf>.

⁷See NRC Advisory Committee On Reactor Safeguards, p. 53.

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

surround the rebar. In turn, this could lead to water infiltration, rebar corrosion, and severe degradation.

We would expect that the NRC would have required further examination of any area with evidence of bowing rebar—no matter how slight the bowing may be. But, we were aghast to find out no further examination has been ordered. How can the NRC possibly justify that lack of action? Furthermore, how could something that is reported to the Advisory Committee not appear in any NRC inspection report? And, we wonder if Dr. Bayrak in his study has factored in that the rebar is already adversely impacted—bowed—due to ASR?

With concrete degradation and bowing rebar, how would the Seabrook plant fare in an earthquake? We remind *everyone* that a 4.0-level earthquake occurred only 50 miles from Seabrook about this time last year. What if it had been closer or stronger?

There is no way that the NRC can *guarantee* that Seabrook can withstand a powerful seismic event given ASR. The plant's design engineers took into account the groundwater infiltration because they knew the plant was built in a salt marsh.⁸ They undoubtedly made conservative assumptions about what strength was needed to ensure that plant could withstand an earthquake that might be expected in the region.

Without *hard evidence* that design engineers factored in micro-cracking of concrete structures due to ASR, the original calculations for rendering the plant safe from seismic activity cannot be assumed to be adequate. *In other words, if*

⁸Region I has a dismal track record of protecting the public from the risks posed by groundwater infiltration at Seabrook. When the plant was constructed, it was recognized that groundwater would infiltrate. For this reason, the plant's design engineers had a membrane constructed around the plant's foundation to mitigate infiltration. This membrane failed during construction due to a backhoe-related breach and other problems. Rather than require the plant to rebuild the membrane, however, Region 1 accepted the plant's proposal to pump water out as a surrogate for the membrane. But, the pumping scheme has not worked, and groundwater infiltration has continued unabated. In brushing off the need to mitigate groundwater infiltration, Region I became culpable for exacerbating the ASR problem and, in turn, placing the public at risk.

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

they had known about the potential for ASR they would have made even more conservative assumptions about what strength was needed to withstand an earthquake.

Do we need to remind Region I that the “root cause” of the Fukushima disaster, at least in part, was an earthquake? Is Region I going to let history repeat itself and stand idly by while the same thing happens to us?

To further substantiate our criticism of the NRC’s claim that the plant can operate safely in the short-term, consider the following:

1. In making its claim, the NRC reviewed and approved evidence provided by NextEra that it had visually inspected a “limited number” of rebar and determined that the rebar was unaffected by the ASR-degraded concrete. But, the NRC offered no details as to the number of rebar examined or the sampling methodology, if any. The NRC’s use of the phrase “limited number” undermines its commitment to transparency. The public deserves to know how many rebar were sampled and how they were sampled.” And, the public deserves to know on what basis the NRC approved the “limited” number and approach.
2. The NRC did not abide by its own review standard, which is based on American Concrete Institute standards.⁹ These standards call for “periodic visual inspections” for signs of leaching, staining, and spalling. They also call for groundwater and soil testing to explore the potential for corrosion of the steel rebar by aggressive chemicals, such as chlorides or sulfates. Since both of these chemicals have already been detected in the groundwater around Seabrook, why would the NRC forgo further groundwater and soil testing? ASR-related micro-cracking provides new pathways for chemical infiltration. There is no evidence that NextEra

⁹American Concrete Institute, “Evaluation of Existing Nuclear Safety Related Concrete Structures” (349.3R-96).

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

conducted *periodic* examinations. In fact, instead of “periodic” inspection, the NRC determined that “no additional rebar examinations are currently warranted.”¹⁰ The NRC should have ordered NextEra to continue the inspections, particularly since they knew the rebar was “bowing” and the foundation was “degraded.”

3. NextEra had not tested all of the plant structures that have rebar as of July 2013, according to a NRC official. Specifically, he has stated that Seabrook structures that have rebar on the inside and outside had not been tested, and thus the NRC has no idea if and how these structures have and will be affected. If the NRC official informed the Advisory Committee of this blatant deficiency why wouldn't Region 1 take steps to address this?

To recap, the NRC failed to (1) disclose how many rebar were examined, (2) abide by its own standards, and (3) require that all rebar configurations be inspected.

In plain language, what all this means is that the NRC's claim that the plant is operable in the short-term is unfounded.

Based on these concerns—which completely refute the NRC's short-term operability claim—it's incumbent on you, Mr. Lew, as Region 1's Deputy Director, to order Region 1 to reverse its short-term operability decision. Furthermore:

No More Fukushimas urges Region 1 to order NextEra to launch an immediate shutdown of the Seabrook Plant on behalf of public safety.

¹⁰NRC Region 1, “Seabrook Station Unit No. 1 Confirmatory Action Letter, Follow-up Inspection NRC Inspection Report”, 05000443/2012010, p.13.

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

Conclusion

In concluding, No More Fukushimas would like to turn for just a moment from public safety to shareholder safety. Mr. Walsh, as NextEra's site vice-president, *please* do not forget that Seabrook has a track record of bankrupting its owners.

Furthermore, you *must* be aware that your company is in a position quite similar to Entergy, the Vermont Yankee owner, which *relentlessly* fought to keep that troubled nuclear plant open. Entergy suddenly reversed itself earlier this year and announced that the plant would be shut down. This was due, in part, to the new economics of lower-priced gas and renewables that you also face, but certainly the decision to shut down Vermont Yankee's was also due to the troubled history of that facility and the tremendous cost to keep it safely operating.

When all was said and done, the Governor of Vermont concluded that even with the loss of 600 high-paying jobs: "This is the best decision for Vermont."

Mr. Walsh, when the public becomes fully aware of the risk you are taking with their lives, property, and businesses, there won't be any crocodile tears here either when Seabrook shuts down.

We will not quibble with the much ballyhooed Nuclear Energy Institute estimate that Seabrook has contributed over its lifetime more than \$500 million dollars into the economy. But, we see no estimate in the report of the unfathomable losses that would occur if a radiological release were to sweep across a 10-mile, or 50-mile, or even larger radius of the Seabrook plant.

It really saddens us that the good folks at the New Hampshire Business and Industry Association did not consult with their counterparts in Fukushima before rubber stamping the Nuclear Energy Industry report.

As a top executive, Mr. Walsh, it is incumbent on you to consider the *hard facts*: NextEra's high-stakes study has more cracks than the plant's foundation. This can

NO MORE FUKUSHIMAS
Statement for Nuclear Regulatory Commission Public Meeting
Hampton, New Hampshire – December 18, 2013

only result in an increased risk to public safety while the study drags on and dire financial risk for your company.

Is NextEra convinced that it wants to bet untold millions of dollars on the fixes that Dr. Bayrak's follow-up remediation studies are likely to recommend? Is NextEra convinced that it wants to bet even more millions on a seawall for the plant as sea levels rise?

We need not remind you that it is your moral obligation, as well as your fiduciary responsibility, to inform your shareholders about statements made tonight in this official NRC public meeting.

When considering the intractable problems facing Seabrook, a familiar phrase comes to mind: *no building is stronger than its foundation*. And there is no shame in shutting down—four nuclear plant owners shut down in 2013 in the United States and another is expected in 2014.

In closing, based solely on our concern for public safety, No More Fukushimas urges NextEra to withdraw its relicensing application and move to shut down Seabrook Station.

No More Fukushimas dedicates our statement tonight to the hundreds thousands of people who reside within and outside of Seabrook's emergency evacuation zone and to the suffering people of Fukushima.