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Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor

Comment On: NRC-2013-0136-0002

Draft Reports; Availability: Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor

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Submitter Information

Name: Barbara Warren

Address:

Citizens' Environmental Coalition
33 Central Ave.
Albany, NY, 12729

Email: warrenba@msn.com

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General Comment

See attached file(s)

Attachments

Final AGREE Comments NRC Spent Fuel study 7.13

SUNSI Review Complete
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Add= *D. Aljama (dra)*

AGREE New York

2013 E. Genesee St., Syracuse, NY 13210 | info@agreenewyork.org | (315) 480-1515

Alliance for
a Green
Economy

July 30, 2013

Cindy Bladey, Chief
Rules, Announcements and Directives Branch
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Citizens
Awareness
Network of
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Center for Health
Environment and
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Peace Action
Central New York

Peace Action New
York State

Sierra Club
Atlantic Chapter

Syracuse Peace
Council

**Re: Docket ID NRC-2013-0136
NRC Draft Report " Consequence Study of a Beyond-Design-Basis Earthquake Affecting
the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor", June 2013.**

The Alliance for a Green Economy represents seven environmental organizations in New York and collectively thousands of New Yorkers, working to educate and protect the public from unsafe and unsustainable energy sources and to promote environmentally preferred fuel alternatives. In January of this year, we submitted comments regarding what should be studied and evaluated related to "Waste Confidence," even though the NRC had not provided a draft scope to the public.

The Draft Spent Fuel Study released by the NRC in June 2013 is inadequate for the following reasons:

1. The Draft study is not responsive to the Court's specific direction in June 2012 regarding what must be thoroughly evaluated.

As the NRC explains in its public notice this study was launched following the March 2011 Fukushima nuclear accident to evaluate the consequences of an earthquake to a spent fuel pool. The study looks only at pool leakage resulting from an earthquake.

However, the Court decision in June 2012, US Court of Appeals for the District of Columbia Circuit, concerning NRC's waste confidence decision, required NRC to thoroughly evaluate the following:

1. the environmental effects of failing to secure permanent disposal
2. the risks of spent fuel pool leaks
3. the consequences of spent fuel pool fires.

This study is limited to only one circumstance - an earthquake -- causing leaks at the spent fuel pool. As a result, this study is not adequately responsive to the Court's decision. All of the risks leading to and associated with spent fuel pool leaks were to be thoroughly evaluated including the risk of fires, the possibility of damage from earthquake, hurricane, or terrorist or other causes of drain-downs or boil-downs (such as power loss).

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2. Independent scientists, the public interest community and the staff of the Nuclear Regulatory Commission have all recommended moving spent fuel out of pools, and reducing overcrowding.

The Fukushima nuclear disaster occurred approximately 3 months after the NRC Final Waste Confidence decision in December 2010. Not only was spent fuel spewed from explosions at the GE Mark I reactors at Fukushima Daiichi, but the continuing unstable condition of spent fuel at Unit #4 threatens a conflagration that could spread severe radioactive contamination across the globe, at levels many times worse than Chernobyl. The early GE Mark BWR designs are of particular concern because of their vulnerability to explosions and the location of the spent fuel pool above the reactor core and outside the containment. Two major significant recommendations were made by independent scientists and a very large public interest community immediately following the Fukushima catastrophe:

- Close all of the Mark I reactors immediately
- Reduce the inventory of spent fuel held in pools by removing to hardened on-site storage at reactors. US reactors were noted to have 4-5 times the amount of spent fuel in pools, than was stored at reactors at Fukushima Daiichi.

The NRC staff to its credit proposed eventually dealing with the crowded spent fuel pools at nuclear reactors and recommended adding this action as a Tier 3 recommendation of the Fukushima Near Term Task Force Report.

3. A number of scientific studies have been completed by the Nuclear Regulatory Commission and the National Academy of Sciences which document the severity of the problems of overcrowded spent fuel pools and the potential catastrophic risks. This body of scientific work, which includes that of Allison Macfarlane, the current Commission Chairperson, cannot now simply be ignored by the NRC.

The 51-page article cited below was written by a team of authors, including Allison MacFarlane, the current Commission Chairperson.

Alvarez, R. et.al., *Science and Global Security*, 11:1–51, 2003

Summary

"Because of the unavailability of off-site storage for spent power-reactor fuel, the NRC has allowed high-density storage of spent fuel in pools originally designed to hold much smaller inventories. As a result, virtually all U.S. spent-fuel pools have been re-racked to hold spent-fuel assemblies at densities that approach those in reactor cores. In order to prevent the spent fuel from going critical, the fuel assemblies are partitioned off from each other in metal boxes whose walls contain neutron-absorbing boron. It has been known for more than two decades that, in case of a loss of water in the pool, convective air cooling would be relatively ineffective in such a "dense-packed" pool. Spent fuel recently discharged from a reactor could heat up relatively rapidly to temperatures at which the zircalloy fuel cladding could catch fire and the fuel's volatile fission products, including 30-year half-life ¹³⁷Cs, would be released. The fire could well spread to older spent fuel. The long-term land-contamination consequences of such an event could be significantly worse than those from Chernobyl.

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No such event has occurred thus far.[article written pre-Fukushima] However, the consequences would affect such a large area that alternatives to dense-pack storage must be examined—especially in the context of concerns that terrorists might find nuclear facilities attractive targets. To reduce both the consequences and probability of a spent-fuel-pool fire, it is proposed that all spent fuel be transferred from wet to dry storage within five years of discharge. The cost of on-site dry-cask storage for an additional 35,000 tons of older spent fuel is estimated at \$3.5–7 billion dollars or 0.03–0.06 cents per kilowatt-hour generated from that fuel. Later cost savings could offset some of this cost when the fuel is shipped off site. The transfer to dry storage could be accomplished within a decade. The removal of the older fuel would reduce the average inventory of 137Cs in the pools by about a factor of four, bringing it down to about twice that in a reactor core. It would also make possible a return to open-rack storage for the remaining more recently discharged fuel. If accompanied by the installation of large emergency doors or blowers to provide large scale airflow through the buildings housing the pools, natural convection air cooling of this spent fuel should be possible if airflow has not been blocked by collapse of the building or other cause. Other possible risk-reduction measures are also discussed. Our purpose in writing this article is to make this problem accessible to a broader audience than has been considering it, with the goal of encouraging further public discussion and analysis. More detailed technical discussions of scenarios that could result in loss-of-coolant from spent-fuel pools and of the likelihood of spent-fuel fires resulting are available in published reports prepared for the NRC over the past two decades. Although it may be necessary to keep some specific vulnerabilities confidential, we believe that a generic discussion of the type presented here can and must be made available so that interested experts and the concerned public can hold the NRC, nuclear-power-plant operators, and independent policy analysts such as ourselves accountable."

The article (p. 3) also cites a letter from 27 state Attorneys General to Congressional leaders asking for legislation to "protect our states and communities from terrorist attacks against civilian nuclear power plants and other sensitive nuclear facilities," specifically mentioning spent-fuel pools.

In conclusion, the scientists, the public interest community, the NRC staff and the Commission Chairperson, as well as elected officials have all expressed serious concern about the dangers of storing high level radioactive used fuel in overcrowded fuel pools at nuclear reactors. The Court has ordered NRC to thoroughly evaluate all of the risks, and this study fails to do so.

Thank you for your attention.

Sincerely,



Barbara Warren
Executive Director
Citizens' Environmental Coalition



Jessica Azulay
Organizer
Alliance for a Green Economy