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# PUBLIC SUBMISSION

**Docket:** NRC-2015-0225

Emergency Preparedness Requirements for Small Modular Reactors

**Comment On:** NRC-2015-0225-0002

Emergency Preparedness for Small Modular Reactors and Other New Technologies: Draft Regulatory Basis for Comment

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## General Comment

See attached file(s)

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## Attachments

NRC20150225Thatcher

Subject: Public Comment regarding US Nuclear Regulatory Commission rulemaking, Emergency Preparedness Rulemaking with Regard to Small Modular Reactors and Other New Technologies (RIN: 3150-AJ68; NRC Docket ID: NRC-2015-0225)

Comment submission by Tami Thatcher, Idaho Falls, Idaho

## **Small Modular Reactors (SMRs) Seek to Shrink Emergency Planning Zones**

The US Nuclear Regulatory Commission is reviewing emergency planning zones for Small Modular Reactors and other technologies such as non-light-water reactors and medical isotope production facilities.<sup>1</sup>

The Small Modular Reactor industry has indicated that reduction of the emergency planning zones (EPZs) will be a key factor in the business case for SMR feasibility and development, according the NRC website. Apparently they want to build SMRs at closed fossil power stations in relatively populated areas and find the nuclear plant emergency planning to be problematic.

The current regulations for Emergency Planning Zones are based on studies performed decades ago for a large pressurized-water reactor or boiling-water reactor. NUREG-0396 recommends a 10-mile radius plume exposure pathway (16 kilometers) and a 50-mile radius ingestion exposure pathway (80 kilometers) to reduce radiation doses to nearby populations. Protective Action Guidelines are 1 to 5 rem (10 to 50 mSv) total effective dose equivalent under unfavorable atmospheric conditions. Preplanned protective actions are identified in the 10-mile and 50-mile EPZ areas.

The NRC website states that “Preapplication information and SMR design concepts provided by NuScale, mPower™, and Westinghouse indicate that these SMRs could have lower offsite dose consequences in the unlikely event of an accident, although this has not yet been verified.”

The NRC staff’s intent is to develop a technology-neutral, dose-based, consequence-oriented emergency preparedness framework for small modular reactor (SMR) sites that takes into account the various designs, modularity and collocation, as well as the size of the emergency planning zone (EPZ), with the expectation that an applicant will provide a well-justified technical basis for NRC’s review and consideration.

The NRC typically dismisses spent fuel storage pool accident issues and excludes accidents caused by sabotage. Natural hazard phenomena that can pose severe accidents have often been downplayed by the NRC in order to delay or avoid needed upgrades to facilities. The NRC softens requirements if the industry finds meeting the requirements too expensive. The NRC has tended to dismiss the accidents involving spent nuclear fuel pools by arguing that the accident

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<sup>1</sup> US Nuclear Regulatory Commission rulemaking, Emergency Preparedness Rulemaking with Regard to Small Modular Reactors and Other New Technologies (RIN: 3150-AJ68; NRC Docket ID: NRC-2015-0225) See <https://www.nrc.gov/reactors/new-reactors/regs-guides-comm/ep-smr-other.html>

likelihood is low despite the vulnerability to sabotage. The NRC also continues to use radiation health models that underestimate the actual health harm to humans from radiation exposure.<sup>2</sup>

In my view, customizing emergency planning zones commensurate with actual hazards posed by the facility should not be only in the direction of EPZ reduction. The NRC must also act to increase EPZs when new information informs us that existing EPZs are too small. Traffic constraints or the presence of hospitals which cannot be evacuated quickly should also be taken into consideration.

Air-borne plume exposure is the only release type addressed by the current emergency planning, not groundwater contamination. Bas-mat melt through and contamination of groundwater was an afterthought in the evolution of NRC accident modeling. The Department of Energy continues to ignore groundwater contamination resulting from accidents at its nuclear facilities. After all, why should the Department of Energy worry about accident releases that contaminate groundwater when for years the agency ignored deliberate contamination of groundwater from nuclear waste burial, disposal wells, percolation ponds, and leakage of piping and tanks containing radioactive materials. The track record for commercial nuclear power plants licensed by the NRC to contaminant nearby residential and public water supplies is also lousy.

While the NRC maintains that existing EPZs protect the public, especially in highly populated areas it is known that evacuations cannot take place quickly enough to protect people. And as with the 1979 Three-Mile-Island accident, the 1986 Chernobyl accident, and the 2011 Fukushima accident, the unpredictability of the radiological releases and weather patterns spreading the releases resulted in belated evacuations and movement of people into more highly contaminated areas. The NRC marches on as though existing emergency planning is adequate, despite evidence to the contrary. The truth about the lives shortened by the Three Mile Island Unit 2 accident matters.<sup>3</sup> And pretending that everyone will be fine after plume passage is fantasy — the radioactive contamination will remain harmful for generations. The compensation for lost homes and property or lost property values will never be fully compensated and the loss of health will not be compensated.

When emergency planning zones are relaxed and larger populations are near to SMRs, more people will be exposed to the routine air and groundwater emissions from these plants. The NRC cancelled the only adequately designed epidemiology study slated in the US claiming that the \$8

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<sup>2</sup> “Health Risks from Exposure to Low Levels of Ionizing Radiation BEIR VII – Phase 2, The National Academies Press, 2006, [http://www.nap.edu/catalog.php?record\\_id=11340](http://www.nap.edu/catalog.php?record_id=11340) The BEIR VII report reaffirmed the conclusion of the prior report that every exposure to radiation produces a corresponding increase in cancer risk. The BEIR VII report found increased sensitivity to radiation in children and women. Cancer risk incidence figures for solid tumors for women are about double those for men. And the same radiation in the first year of life for boys produces three to four times the cancer risk as exposure between the ages of 20 and 50. Female infants have almost double the risk as male infants.

<sup>3</sup> Steve Wing, David Richardson, Donna Armstrong, and Douglas Crawford-Brown, A Reevaluation of Cancer Incidence Near the Three Mile Island Nuclear Plant: The Collision of Evidence and Assumptions, Volume 105, Number 1, January 1997, Environmental Health Perspective

million cost was too high.<sup>4</sup> But existing epidemiology from countries other than US already prove that it is not safe to live within a few miles of nuclear plants, despite the lack of understanding exactly which radionuclides are causing the increase in childhood cancers within 3 miles of the facilities.<sup>5 6</sup>

Sincerely,

Tami Thatcher

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<sup>4</sup> See cancer risk study at [nap.edu](http://nap.edu). The framework for the study was reported in “Analysis of Cancer Risks in Populations Near Nuclear Facilities; Phase I (2012).

<sup>5</sup> See our October 2015 newsletter. Serious epidemiology studies have been conducted in Europe — not like the flawed 1990 study performed in the US that did not and could not possibly detect elevated cancer risk. Studies conducted in Europe have reported increased rates of childhood leukemia around nuclear facilities. In 1992, the [German Childhood Cancer Registry](#) found a statistically significant increased incidence rate for leukemias among children below five years of age within the 5-km-zone around nuclear sites. A second study was published in 1997, and again found increased childhood leukemias near nuclear plants.

The third study was initiated, funded and published by the [Federal Office for Radiation Protection on behalf of the Federal Ministry for the Environment](#) and conducted by the German Childhood Cancer Registry on childhood cancer near nuclear installations. The study is known by its German acronym KiKK (Kinderkrebs in der Umgebung von Kernkraftwerken). The KiKK study on Childhood Cancer in the Vicinity of Nuclear Power Plants, completed in 2007 is scientifically rigorous and statistically sound and its peer reviewed results show significantly elevated cancer risk for children under five years of age living within 5 km of a nuclear power plant. The study looked at childhood leukemia and cancer near nuclear plants from 1980 to 2003.

The German Federal Office for Radiation Protection formally confirmed these findings, stating that ‘in the vicinity of nuclear power plants, an increased risk of 60 per cent was observed for all types of childhood cancer, and for childhood leukaemia the risk doubled equaling a risk increase of approximately 100 per cent’.

<sup>6</sup> See Environmental Defense Institute’s April 2009, May 2010, and January 2014 newsletters for more about the harm from the 1979 Three Mile Island Unit 2 accident at [www.environmental-defense-institute.org](http://www.environmental-defense-institute.org)