

**To:** [Consultation \(CNSC/CCSN\)](#)  
**Subject:** Comments on [Draft] REGDOC-1.1.5 Licence Application Guide: Small Modular Reactor Facilities  
**Date:** November-20-18 9:51:41 PM  
**Attachments:** [Submission-to-CNSC-20November2018.pdf](#)

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I would like to submit the attached comments on REGDOC-1.1.5 Licence Application Guide: Small Modular Reactor Facilities.

Thank you,  
Ramana

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20 November 2018

To  
Canadian Nuclear Safety Commission  
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280 Slater Street Ottawa,  
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Re: REGDOC-1.1.5: Licence Application Guide: Small Modular Reactor Facilities.

The regulatory document is based on the idea of offering a “graded approach, commensurate with risk”. Any such approach presumes that risk can be measured in advance. Within regulatory circles, the usual definition of risk involves knowledge of two quantities: the frequency or likelihood of a specific outcome and the consequence of that outcome in terms of damage to the economy, human health or the environment. Both of these are highly uncertain and there is ample evidence from the past showing that one or both of these quantities have been often mis-estimated, often by parties that stand to gain from such mis-estimation. The standard technique used in nuclear regulation, probabilistic safety analysis or probabilistic risk assessment, has numerous problems.<sup>1</sup> A precautionary approach that starts with the assumption that very severe consequences are possible should be the basis for any policy making when it comes to nuclear power. This is further complicated by the fact that there is no real life experience with most of the reactor designs that are being considered under this guide and practically all the information available on them is put out by the companies that are developing these designs and that can profit from these ventures.

The consequences of reactor accidents in the case of Small Modular Reactors (SMRs) could be worse because SMR vendors envision siting their reactors in relatively close proximity to population centers. Companies that market SMRs also propose placing multiple reactors in close proximity to save on costs of associated infrastructure. But this would increase the risk of accidents or the impact of potential accidents on the surrounding population. At Japan’s Fukushima nuclear complex, explosions at one reactor damaged the spent fuel pool in a co-located reactor. Radiation leaks from one unit made it difficult for emergency workers to approach the other units.

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<sup>1</sup> M. V. Ramana, “Beyond Our Imagination: Fukushima and the Problem of Assessing Risk,” *Bulletin of the Atomic Scientists*, April 20, 2011, <http://thebulletin.org/beyond-our-imagination-fukushima-and-problem-assessing-risk-0>; Minh Ha-Duong and Venance Journé, “Calculating Nuclear Accident Probabilities from Empirical Frequencies,” *Environment Systems and Decisions* 34, no. 2 (June 1, 2014): 249–58, <https://doi.org/10.1007/s10669-014-9499-0>; Suvrat Raju, “Estimating the Frequency of Nuclear Accidents,” *Science & Global Security* 24, no. 1 (2016): 37–62; Spencer Wheatley, Benjamin Sovacool, and Didier Sornette, “Of Disasters and Dragon Kings: A Statistical Analysis of Nuclear Power Incidents and Accidents,” *Risk Analysis* 37, no. 1 (January 1, 2017): 99–115, <https://doi.org/10.1111/risa.12587>.



For these reasons and others, CNSC should exercise the greatest caution in licensing Small Modular Reactors, especially when these involved a novel nuclear technology. Thank you for your consideration.

Sincerely,

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