To the committee,

I thank the committee for considering this supplemental submission.

After reading IAEA-TECDOC-1681, it is clear that not only should the minister be empowered to approve the construction of new 'research' reactors, he should be severely disciplined if he fails to approve at least one per year. The OPAL reactor facility was designed to have the largest NTD capability in the world with a current capacity of 50t and some room for expansion. Global demand was conservatively estimated to potentially be 2000t, " It is not certain whether this future demand will be met by reactors. If the supply of
NTD-Si is not sufficient, the industry may use another, likely more expensive, technology." NTD is the cheapest production silicon doping method. It also produces the highest uniformity compared to other processes enabling the highest linearity and lowest resistivity meaning highest energy efficiency silicon. Fluctuations in global market demand are not due to actual industry demand but expected global reactor capabilities. Unfortunately many research reactors shut down due to age leading to a drop in 'demand' ie. manufacturers did not place orders that could not be fulfilled and changed their designs to be operationally compatible with less efficient material. The real market demand is the entire market. If there was continuous reliable industry processing capacity, the entire semiconductor industry would be NTD. Historically it has held about a 10% share. Semiconductor designs must be planned for lower efficiency simply due to the lack of low resistivity materials that NTD provides. Transistors must be larger and or spaced further apart wasting precious die space due to physical limits of the ability to conduct heat away from the higher resistivity material. Not only are products more efficient and cheaper to produce but also require less die space and fit into a smaller package. Industry design will not change in lockstep but considering the time scales involved from planning the deployment of a research reactor to achieving operational design capacity, demand will ramp imperceptibly with capacity.

As a matter of global and domestic importance it is absolutely necessary to expand production capacity immediately. High efficiency solar cells and especially high efficiency power transistors are absolutely required yesterday. Power conversion stages are very costly and waste tremendous amounts of power. Electric motors, wind turbines, battery, other power storage technologies and solar installation efficiency can be increased and cost can be brought down dramatically by rapidly building planned capacity for NTD semiconductor processing.

The legislation should specify that only thermal 'research' reactors built for the main purpose of value adding semiconductor materials may be approved by the minister. This way we can reduce power requirements and increase renewables production rather than increasing power production with large scale nuclear reactors.

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