Comments of Herschel Specter (mhspecter@verizon.net)

This draft grossly underestimates the need for DEFRs. (1) The grid must be designed for extreme events, hot and cold, maintaining present NYISO reliability requirements, not average conditions. This requires far more capacity or storage. Weather extremes are where the maximum pub(2) Figure 1 is wrong. The original Figure 34 in NYSRDA's Appendix G recognized that this analysis only covered one week in winter, depending on batteries to make up the shortfall. However, other winter weeks also have shortfalls, but the batteries would be depleted by then, unless even greater battery capacity is purchased. A full year needs to be analyzed, not just one week. But this one week already requires 25 GW of batteries. What is the cost for a full year's battery capacity? (3) Hydrogen storage and transmission through pipelines don't work. To achieve volumetric energy densities like natural gas, H2 has to be compressed to pressures like 10,000 to 15,000 psi, well beyond the design pressure of present gas lines and probably beyond what salt caverns can withstand, H2 leaks through stainless steel and embrittles this metal. (4) With neither batteries nor hydrogen, renewables can not be our major energy source and must rely on DEFRs .Will these DEFRs be natural gas, as NY uses today, or will we really get serious about climate change and greatly ramp up nuclear?

SAFETY OF SMRS

Section 4.2.1 of the draft report on the safety of SMRs refers to “Advanced Isn’t Always Better…” by Edwin Lyman (references 62,63, and 64). These references should be used with great caution. They imply that if a reactor design has a positive reactivity coefficient, this could lead to a catastrophic event.

This is a gross, misleading, simplification. The Canadian CANDU design has a positive reactivity coefficient and these reactors have operated safely for decades. Lyman attempts to connect the Chernobyl accident to SMRs because the Chernobyl design had a positive reactivity coefficient and a power excursion did occur during the accident. Lyman does not estimate what these reactivity coefficients are for different SMRs or if they are positive or negative. Lyman does not identify plausible situations that might initiate power excursions in SMRs. Lyman neglected to say that operators at Chernobyl had dismantled specific safety systems that would have prevented the Chernobyl accident from happening. Lyman neglected to say that Chernobyl had a weak confinement building, not the robust containment structures like that at the Three Mile Island 2 nuclear plant (and at Indian Point) which completely contained a full melt down of the reactor core. Was the large release of radioactive material from Chernobyl due to its positive reactivity coefficient or due to having a weak confinement building? Where is the analysis that estimates how much radioactive material might enter the environment if a SMR had a power excursion? From a safety perspective, connecting Chernobyl to SMRs is tenuous, at best.

Power excursions are self limiting. The extra energy they produce changes the reactor’s configuration, such as expanding the moderator (water in light water reactors) and/or the fuel matrix, etc. These expansions reach a point where the altered reactor configuration is not capable of further increases in power production and the power excursion begins to end. Thus, a power excursion is like a pulse of energy. Lyman has not presented the amounts of energy produced by any of his speculated power excursions or what damage to the fuel, if any, these excursions might cause. Lyman did not tell us if damaged fuel would be contained within the reactor vessel, as was the case in the FERMI 1 accident in 1955. Lyman made no mention that the full meltdown at TMI 2 was completely contained or that in all the decades since the1986 Chernobyl accident, no offsite latent cancer fatalities from that accident have been detected. Lyman did not present any estimates of the amounts and types of radioactive material that his power excursions might release to the environment and their potential radiological health and economic consequences.

Lyman appears to want the readers of “Advanced Isn’t Always Better…” to jump from some SMRs having positive reactivity coefficients to offsite catastrophic consequences, skipping over all the intermediate steps that would prevent this from happening.

Claiming huge radiological consequences from hypothetical nuclear accidents is not new. A report that Lyman co-authored*, received national prominence and ended up being reviewed by the National Academy of Sciences. It claimed that a fire in a spent fuel pool could lead to 50,000 to 250,000 latent cancer fatalities. This sensational report had many errors. It was pointed out that it overstated the size of the population at risk. Lyman and two other original co-authors quietly wrote a second report** [“Damages”}, correcting the population error. Using this population correction, latent cancer fatalities were estimated for five different nuclear plants, Including Indian Point. Results ranged from 1,900 to 5,700, up to 44 times smaller than the original highly publicized numbers. Even then, the 1,900 to 5,700 figures are too high. Correcting some of the remaining errors would have reduced the postulated number of latent cancer fatalities to at or near zero, similar to actual long term experience downwind from Chernobyl. If every microgram of radioactive cesium were released by a fire in an Indian Point spent fuel pool, or about 35 MCi of Cesium-137, Lyman, et al, estimated that 5,600 latent fatalities would occur.

Lyman also is the author of “Chernobyl on the Hudson”*** [COH]; his analysis of potential consequences from accidents at the Indian Point nuclear plant. The peak number of latent fatalities in this highly flawed analysis was 518,000 latent cancer fatalities for a release of 3.75 MCi of Cesium-137.

These figures present a major problem. How can 3.75 MCi of Cs-137 in Lyman’s Indian Point COH report would cause 518,000 latent fatalities when the release of 35 MCi at Indian Point in Lyman’s “Damages” report would cause 5,600 latent fatalities? The release of radioactive cesium in Lyman’s COH report is 9.33 times smaller than Lyman’s “Damages” report yet caused latent fatality consequences that were 92.1 times larger. How can this large disparity be reconciled?

Even more distressing is that Lyman’s “Damages” report, with its much smaller Indian Point latent fatality consequences, was published in January, 2004, while Lyman’s COH Indian Point report with its much larger latent fatality consequences, was published a just a few months later in September, 2004.

* “Reducing the Hazards From Stored Spent Power Reactor Fuel in the United States”. Robert Alvarez, et al, Science and Global Security 11, January 22,2003.
** “Damages from a major release of Cesium-137 into the atmosphere of the United States.” Jan Beyea, Edwin Lyman, and Frank von Hippel, Science and Global Security 12, January 1,2004.
*** “ Chernobyl on the Hudson?, The Health and Economic Impacts of a Terrorist Attack at the Indian Point Nuclear Plant”, Edwin S. Lyman, Union of Concerned Scientists, September,2004.