Comments of Patricia K Townsend PhD Climate

 April 23, 2018

Dear Mr. Krentz:

While I hope to submit on other topics if time permits, I will concentrate in this comment on climate change, which I consider to be a major challenge to any effort to model the future of the West Valley nuclear site.

By training, I am not a climate scientist but an anthropologist. For the past two decades I have read in depth on climate science to make judgments on what to write in successive editions of my textbooks, *Medical Anthropology in Ecological Perspective* (6th edition, coauthored with Ann McElroy, but I was responsible for drafting the climate chapter), and *Environmental Anthropology* (3rd edition, 2018). I have also been invited to review books and manuscripts on climate change for anthropological journals. I have provided volunteer service on the board of New York Interfaith Power and Light and the WNY Interfaith Climate Justice Community.

1. Even for someone skilled in online and library research, it is not easy to search out the relevant assumptions that DOE and NYSERDA are likely to make within the dSEIS and the material on which they will base their decisions. There is not a single combined, searchable site containing the documents that relate to climate and weather, for instance. I ask that DOE and NYSERDA do a better job of making their collection of documents readily searchable so that one can compare among them readily to see what changes have or have not been made.
2. In scoping meetings, NYSERDA orally assured questioners that they would take climate change into account. We can only assume that this will result in some conflict for DOE, unless there is a change in the current political climate of hostility to science.
3. In regard to scientific credibility, we (the public) have seen few scientific peer reviews of documents since the highly critical 2006 peer review and the reviews of the FEIS prepared for NYSERDA in 2009.[[1]](#footnote-1) The most recent ones I have seen are two by the Independent Scientific Panel on the scoping of two Phase One studies. I was grateful to receive these directly from DOE, but they really should be available to all on line. Should we not also see reviews from them of the actual Phase One studies rather than assurances of reviews within the teams without evidence of disagreements and concerns that may have been expressed? Through a University library search, I was able to obtain Independent Scientific Panel member Shrader-Frechette’s published review of the 2010 FEIS, for example, but nothing more recent.[[2]](#footnote-2)
4. The treatment of climate and weather in the FEIS (2010) was inadequate (Ch. 3.7.1), describing only present meteorological conditions, though it was slightly improved from the Draft EIS in that it allowed for the possibility that future climate would be wetter (4.1.10.1 Summary of Long-term Performance Assessment). The scheduling of a workshop on climate in 2012 helped to compensate for this weakness. It was followed by the issuing of climate guidance that I do not find particularly reassuring, for example p. 10 indicates that the spatial resolution of climate models is too coarse and not easily downscaled. In this fast-moving field, 2012 research is seriously out of date.
5. As far as I have been able to determine, no specialists in climate or meteorology have been employed as consultants or scientific reviewers on this project since the 2012 workshop. The Conceptual Site Model of 23 June 2017 (3.2.10.5) says that climate assumptions and approaches will need to be updated for the human health assessments and erosion studies presented in the FEIS. However, it provides no instruction on how or when this is to be done. I have so far seen no evidence of how it was to be done in the erosion studies. It would also seem necessary to take it into account in planning exhumation, but I do not see that the EXWG has done so, but then the exhumation study has many defects, including the failure to consider efficiencies related to a early commitment to full exhumation.
6. One of my first thoughts upon returning to West Valley concerns last fall (after many years of neglect that I now regret) was, “How would that site be affected by a Houston-Harvey type rainfall event?” or several such events over time. My first response was to search for and read recent peer-reviewed articles.[[3]](#footnote-3) Already these few months later, I expect that papers are being presented at scientific meetings that go well beyond these 2017 efforts at modeling storms. And by the time a decision is made about cleanup, modeling will have progressed farther. At what point is rainstorm modeling to be considered adequate? The National Climate Assessments take an increasingly strong position in projecting increases in extreme rainfall events due to climate change in the Northeast Region.
7. The meteorological situation at the West Valley site is complicated by its location at the northern extreme of the Appalachians as well as within the Great Lakes snow belt. Until the 2017 Houston event, the 18 July 1942 Smethport storm, in northern Pennsylvania not far south of West Valley, held the records for rainfall in 3 and 12 hours. Many such “terrain-locked orographic convective systems” occur in the central Appalachians.[[4]](#footnote-4) I would hope to see an analysis that takes trained storms and lake effects into account.
8. The increasing frequency and severity of storms in this region is poorly understood. It may be better understood in the future. This may improve future models, but I conclude that we have insufficient knowledge to make life and death decisions for human and environmental health of the Lake Erie and Ontario region based on our current understanding. Heavy precipitation events are a category of climate process with only a “low to moderate” level of scientific understanding and “moderate to high” probability of significant abrupt change, according to a National Research Council assessment. [[5]](#footnote-5) We will encounter some climate surprises in the near future, whether they are due to methane releases, ocean current changes, or whatever. Global warming continues and the political will to address it seems lacking.

I have little knowledge of erosion, but I have heard and read enough of the site documents to be aware that gully formation is the main concern here. There has been a relative neglect of site stability in the Phase 1 studies. This neglect concerns me in connection with the scenario of abrupt failure due to severe storms at short intervals. “Short” in this case is defined not in absolute terms (such as months or years between storms) but relative to the ability of institutions of the day to respond by re-constructing erosion controls. Landslides cutting into the trenches would be swiftly followed by erosion of the contents of the trenches.

The economic consequences of a low probability but catastrophic failure at West Valley are simply too great to ignore. The World Economic Forum meeting at Davos in November 2017 named weather disasters as the top global risk for the first time.

We should also take into account the social and political consequences if, after one damaging storm, people in the entire watershed live in fear of another event and mistrust the institutions that impose unequal risk on them.

1. Although these comments have been primarily concerned with climate, I must add that I hope that considerations of **environmental justice** would disqualify anything but the most stringent standards for prompt cleanup and restoration to unrestricted use. The Seneca Nation surely experiences the threat of this nuclear waste to their land, air, and water as another case of naming a Native American sacrifice zone, comparable to the many such zones in the American West.[[6]](#footnote-6) I support the Seneca Nation’s request to be considered as a Cooperating Agency in order that they may have stronger participation in the decision-making process.
2. In conclusion, I suggest that the work that has been done on modelling to aid decision-making for the West Valley Nuclear site will undoubtedly help to advance the science. It may aid in deciding among various areas which to clean up first or how to slow the natural processes of erosion. However, I am not convinced that we yet have the ability to make long-range predictions in either geology or meteorology without risking false negatives, that is decisions that erroneously rule out the possibility of catastrophic failure of this site within the time frame required by the long-lived radioactive wastes here.[[7]](#footnote-7)

**Full exhumation and removal seems to me the only reasonable alternative that is protective of public health given our current understanding of climate and weather.**

Sincerely yours,

Patricia K. Townsend, Ph. D.

*Postscript of April 27,2018*

*I have now had the opportunity to skim and search the Erosion Modelling EWG Phase 1 study for climate-related assumptions. Unfortunately, the references cited on climate are no newer than 2013, and I still see no strong evidence of participation by expert meteorologists and climate scientists in the preparation or peer review. Also, there is a single author for the Uncertainty Analysis and no indication (in response to a question at the CTF meeting of April 25, 2018) that a second expert in Uncertainty Analysis has been or will be involved in peer review.*

 *I respect the work that the authors have done, and their humility in presenting the limitations of their work. However, I believe that they are too trusting of expert judgements, and that their input into a decision has the same limitations as earlier work in failing to consider a long enough time span or extreme enough events such as landslides following multiple severe storms and or earthquakes.*

1. John D. Bredehoeft, Robert H. Fakundiny, Shlomo P. Neuman, John W. Poston, and Chris G. Whipple, April 26, 2006, *Peer Review of Draft Environmental Impact Statement for Decommissioning and/or Long-Term Stewardship at the West Valley Demonstration Project and Western New York Nuclear Service Center.* Sean Bennett, *Independent Review of Selected Sections of the 2009 West Valley Decommissioning Final Environmental Impact Statement.* Prepared for NYSERDA November 2009. [↑](#footnote-ref-1)
2. Kristin Schrader-Frechette, 2016, “Uncertainty Analysis, Nuclear Waste, and Million-Year Predictions,” Chapter 12, pp. 291-303, in S. O. Hansson, G. Hirssch Hadorn (eds.), *The Argumentative Turn in Policy Analysis.* Switzerland: Springer International Publishing. [↑](#footnote-ref-2)
3. For Texas, a six-fold increase in probability of area-integrated rainfall from the late 20th century to the early 21st, according to Kerry Emanuel, 2017, “Assessing the present and future probability of Hurricane Harvey’s rainfall,” PNAS, 114(48):12681-12684. Also see Zhe Feng, 2017, “Near doubling of storm rainfall,” *Nature Climate Change, 7:854-856.* Andreas F. Prein, et al. 2017. “Increased rainfall volume from futue convective storms in the US,” *Nature Climate Change* 7:880-884. [↑](#footnote-ref-3)
4. James A. Smith, et al. 2011. “Extreme rainfall and flooding from orographic thunderstorms in the central Appalachians,” *Water Resources Research 47:* [↑](#footnote-ref-4)
5. National Research Council. Committee on Understanding and Monitoring Abrupt Climate Change and its Impacts. *Abrupt Impact of Climate Change: Anticipating Surprises.* 2013 [↑](#footnote-ref-5)
6. Anita Moore-Nall. 2015 “The legacy of uranium development on or near Indian reservations and health implications rekindling public awareness,” *Geosciences 5(1):*15-29*.* [↑](#footnote-ref-6)
7. Kristen Schrader-Frechette, 2014. *Tainted: How Philosophy of Science Can Expose Bad Science.* Oxford University Press. Especially Chapter 14, “Understanding Uncertainty: False Negatives in Quantitative Risk Analysis.” [↑](#footnote-ref-7)