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Sent: Wednesday, January 2, 2019 7:10 AM

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Cc: Wanda Parrish; Patrick White; Paulette Mann; Paulette Mann

Subject: Safety of Cadmium Telluride Solar Panels

Planning Commissioners -- 2 Questions and 2 Recommendations for the Planning Commission meeting tonight that I request that you raise with county staff and/or sPower:

Question 1: Where is the scientific evidence that Cadmium is fully encapsulated inside the solar panels, as claimed?

Question 2: Where are the reports describing environmental damage and clean-up work for solar power facilities that contain Cadmium Telluride panels following major natural disasters such as a hurricane or tornado?

Recommendation 1: Require staff and/or sPower to contact First Solar (manufacturer of CdTe solar panels) to obtain their written statement providing all information that they have on measuring the retention of CdTe inside severely damaged thin-film solar panels.

Recommendation 2: Require staff to obtain expert testimony from an independent consultant that has expertise in Inorganic Chemistry, leaching of heavy metals (preferably CdTe from solar panels), and toxicity of fragments of CdTe panels that are left in the soil and water due to solar panel breakage.

Background:

I have been raising concerns for 10 months about the risks to public health and the environment due to breakage and leaching of Cadmium from the CdTe solar panels that sPower is planning to

install with their proposed project. Originally, they planned to install 1.8 million CdTe panels, but changed their plan from 100% to 50% a couple of months ago. Furthermore, I have been asking for scientific evidence that the Cadmium remains fully encapsulated inside the solar panels following a major natural disaster such as a hurricane or tornado for the last 3 months. No one has responded with any proof that the claimed encapsulation actually occurs.

In contrast, I raised the issue of toxic GenX materials being used in some film coatings on solar panels at the PC public hearing on December 19, and sPower responded on December 27 stating that the First Solar (CdTe panels) and Jinko Solar (crystalline silicon panels) that they plan to use do not contain GenX materials. Therefore, sPower is able to quickly respond to an issue when it suits them.

Why haven't they responded with proof that the claimed encapsulation actually occurs?

Staff contracted with Dewberry to assess the safety of the Cadmium panels. After I criticized their failure to address encapsulation efficiency in their original report (see my email below dated Nov. 27), Dewberry responded to staff in a telephone call on Dec. 17. Both Dewberry documents are included as appendices to the staff reports on the proposed sPower SUPs (see Appendix D & E). Dewberry dismissed one of the references that I provided, even though is demonstrates that high leaching rates can occur under acidic conditions, and that the CdTe dissociates since the Cadmium and Telluride leach at different rates. Instead, Dewberry makes the following statement:

> *"These studies are not indicative of solar panel installations. While there have been very few solar installations that have suffered from catastrophic weather events (hurricanes), there are no documented cases of contamination from solar panels. If a hurricane, tornado or similar event were to occur, there would most likely be property damage across a much wider area than just the solar installation. We do not believe such a catastrophic weather event would lead to the processing, leaching and/or contamination of Cadmium, Cadmium Telluride, or other such materials. Please also recall that CdTe, Cd, Te are not water soluable."*

Question 2 above asks for Dewberry's basis for their statement that "very few solar installations have suffered from catastrophic weather events". Are we to believe that there were no CdTe solar panels in the Caribbean that were damaged by the major hurricanes that destroyed all of the utility scale solar power plants in Puerto Rico and the Virgin Islands? Dewberry concludes that lack of documented cases constitutes proof that there is no problem. That shows a basic lack of understanding of scientific methodology. The lack of proof does not prove the case. Dewberry

also demonstrated a lack of intellectual curiosity -- all they did was read the reports provided and came to an opinion.

Furthermore, Dewberry does not address a recent reference (13May2018) that I provided by Wetzel "Study warns of environmental risks from solar modules" in which he states that contrary to earlier studies, water can wash contaminants out of solar panels in months.

Why didn't Dewberry ask questions such as: "what information is needed to prove encapsulation?" "why hasn't that information been provided?" "is the information too difficult to obtain?" "can leaching occur from broken panels, and if so, how quickly?" "is sPower and the solar industry trying to hide something?" "do I need some expert help to answer these questions?"

Recommendation 2 above requires the staff to obtain independent expert testimony on the safety of CdTe panels by a consultant with expertise in Inorganic Chemistry, leaching of heavy metals (preferably CdTe from solar panels), and toxicity of fragments of CdTe panels that are left in the soil and water due to solar panel breakage. The expert must also be required to perform their own literature search and to challenge sPower, First Solar, and other authors who have made broad statements about the safety of CdTe panels to backup their claims with factual references.

I presume that if sPower could provide any factual references that demonstrate that CdTe solar panels retain all of the CdTe inside the panels following a catastrophic natural disaster, then they would have provided that information already. That is precisely what they did to quickly settle the GenX issue.

Without solid scientific proof, then the risk of widespread environmental contamination following a tornado or other catastrophic natural disaster will be too great. sPower can easily avoid the risks altogether by simply committing to use all crystalline silicon solar panels instead of thin-film type panels. Their resistance to make this change is purely financial since the thin-film panels are cheaper. They are willing to take the risk in order to save some money. However, the <u>Planning Commission should either obtain proof that encapsulation is very effective, or else prohibit all thin-film type solar panels</u>, which is what Culpeper County did in their SUP for a 100 MW solar plant that was approved in October.

References - my recent presentations and email:

Cadmium Problems in Solar Panels - Hammond 15Nov2018

PC Public Hearing 5Dec2018 - More Stalling - Hammond - discusses sPower's vague and incomplete documentation

Questions for Dewberry on their Engineering Evaluations - sPower Solar Project - Hammond email 27Nov2018

I sincerely hope that you will raise these questions and make these recommendations tonight at the Planning Commission meeting.

Please let me know if you have any questions,

Dave Hammond

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