

BEFORE THE
NEW YORK STATE BOARD ON ELECTRIC GENERATION
SITING AND THE ENVIRONMENT

In the Matter of

APPLICATION OF ALLE-CATT WIND FARM FOR A
CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND
PUBLIC NEED TO CONSTRUCT A MAJOR ELECTRIC
GENERATING FACILITY IN THE TOWNS OF ARCADE, CENTERVILLE, RUSHFORD, FARMERSVILLE
AND FREEDOM (ALLEGANY, CATTARAUGUS, AND WYOMING COUNTIES).

CASE NO. 17-F-0282

Direct Testimony of:

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Research Scientist

New York State Department of Health
Empire State Plaza - Corning Tower,
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September ____, 2019

1 **Q. Please state your name and business address.**

2 **A.** My name is Henry Spliethoff. My business address is Corning Tower, Empire State
3 Plaza, Albany, New York 12237.

4 **Q. By whom are you employed, and in what capacity?**

5 **A.** I am employed by the New York State Department of Health (“DOH” or “the
6 Department”) as a Research Scientist and the Chief of the Prevention and
7 Sustainability Section in the Division of Environmental Health Assessment.

8 **Q. Please summarize your related educational background and professional
9 experience.**

10 **A.** I have a Master of Science degree in Civil and Environmental Engineering from the
11 Massachusetts Institute of Technology (1995). I earned a Bachelor’s degree in
12 Environmental Science from the State University of New York at Plattsburgh in
13 1986. I have more than 25 years of combined working experience in the
14 environmental health field and have been employed as a Research Scientist by DOH
15 since 1999. My work has involved assessment, characterization and communication
16 of human health risks associated with environmental exposures. I have reviewed
17 and evaluated many scientific documents describing and addressing potential
18 health risks associated with a wide array of environmental exposures. I reviewed
19 applications and associated documents for several energy facilities to assess

1 potential health impacts under Article X of the Public Service Law prior to its
2 “sunsetting” in 2003. I have contributed to the development of New York State
3 Energy Plans and associated updates since 2008, acting as the DOH staff lead since
4 about 2011. As part of my work in energy planning, I have reviewed and broadly
5 characterized information related to health risks associated with energy use and
6 production ranging from atmospheric pollution, noise, and non-ionizing radiation,
7 to occupational accidents. I have been the DOH staff lead on siting of energy
8 facilities under the new Article 10 of the Public Service Law (“Article 10”) since
9 2011. In early 2016, I assumed the position of chief of the Prevention and
10 Sustainability Section.

11 **Q. What are your duties as the Chief of the Prevention and Sustainability Section at**
12 **DOH?**

13 **A.** I currently lead a team of five research scientists, who work on programs designed
14 to protect public health in several specific topic areas related to the assessment of
15 potential exposures and public health risks associated with environmental agents in
16 different environmental media. The section is also responsible for assistance in the
17 development of exposure guidelines and advice to help reduce environmental
18 exposures. I am responsible for programmatic oversight of the Department's
19 participation in the Article 10 application review process. As such, I oversee staff's
20 review of preliminary scoping statements, stipulations, noise impact assessments,

1 applications, certificate conditions and other documents and participate in the
2 development of the Department's comments on those documents.

3 **Q. What is the purpose of your testimony?**

4 **A.** The Commissioner of the New York State Department of Health is a statutory
5 member of the Article 10 Board on Electric Generation Siting and the Environment
6 ("Siting Board"). DOH's mission is to protect, improve and promote the health,
7 productivity and well-being of all New Yorkers. In support of that mission, DOH staff
8 want to ensure that the Siting Board is presented with sufficient evidence to
9 support a finding on the nature of the impacts of the proposed Alle-Catt Wind Farm
10 facility ("the Applicant") on public health. Under Article 10, before issuing a
11 Certificate, the Siting Board must determine that any "adverse environmental
12 effects of the construction and operation of the facility will be minimized or
13 avoided to the maximum extent practicable" (PSL § 168(3)). While DOH recognizes
14 the global and regional health benefits of renewable energy sources such as wind
15 power, we believe that siting of emission-free wind turbine projects should proceed
16 by minimizing any adverse effects on public health to the extent practicable. In that
17 context, the purpose of my testimony is to provide an assessment of specific health
18 protective guidelines and their applicability to the proposed Alle-Catt Wind Farm
19 facility. My focus will be in the areas of noise emitted by turbine operation and
20 "shadow flicker," the alternating shadows cast by rotating wind turbine blades.

1

2 **Q. Are you sponsoring and/or relying upon any exhibits as part of your testimony?**3 **A.** Yes, I am sponsoring six specific exhibits: Ex. ____ (HMS-1), the World Health4 Organization *Environmental Noise Guidelines for the European Region (2018)*;

5 Ex. ____ (HMS-2), a scientific paper that describes personal and situational variables

6 associated with noise annoyance from the Health Canada study by Michaud *et al.*

7 (2016); Ex ____ (HMS-3), a paper describing perceptual responses and reported

8 health effects of wind turbine noise from the Health Canada study by Michaud *et al.*

9 (2016); Ex ____ (HMS-4), a scientific paper that describes the results of a recent

10 turbine noise study in Finland by Hongisto and Oliva (2017); Ex. ____ (HMS-5), a

11 report for the National Association of Regulatory Utility Commissioners on Wind

12 Energy & Wind Park Siting and Zoning Best Practices (2012); and Ex. ____ (HMS-6), a

13 scientific paper by Voicescu *et al.* (2016) that describes specific findings from the

14 Health Canada study related to shadow flicker.

15 **Q. Could you provide a summary of your testimony?**16 **A.** I will provide some background information on the health effects of noise. I will

17 discuss factors that DOH considers in identifying appropriate guidance values to

18 assess environmental exposures and risks to human health. I will recommend that

19 short-term regulatory limits for audible noise be included in the final certificate

20 conditions for the Alle-Catt Wind Farm such that estimated long-term facility noise

1 impacts for non-participating receptors do not exceed a long-term guidance value
2 that has been recommended by the World Health Organization (“WHO”). My
3 testimony will also discuss a study which characterizes impacts of shadow flicker
4 and I will provide support for a strategy to minimize the impact of shadow flicker
5 on the community and sensitive receptors.

6 **Q. Can you provide some background on the potential health impacts associated**
7 **with audible noise from wind turbines?**

8 **A.** Based on the Department’s review of information related to noise and health, if a
9 wind facility is not properly sited or operated, there is potential for turbine noise to
10 impact the health and wellbeing of nearby residents. Wind turbines emit sound or
11 "noise," created primarily by the interaction of turbine blades and the wind, at
12 levels of over 100 "A-weighted" decibels (dBA) (weighted to account for human
13 hearing). Although the level of this noise diminishes with distance from the
14 turbines, the turbines' noise can be perceived at nearby locations that can include
15 residences and other sound receptors. Recognized health-related effects of audible
16 noise include annoyance, sleep disturbance, cognitive performance reduction,
17 effects on social behavior, cardiovascular effects, and psycho-physiological effects
18 (*e.g.*, noise induced stress reaction). The potential for health effects from noise
19 depends upon its level and, to some extent, the time interval(s) over which it

1 occurs. For example, higher levels of noise can be associated with cardiovascular
2 effects and speech interference, while lower levels can have effects such as
3 annoyance and sleep disturbance. More health impacts may occur at lower levels
4 over longer exposures (*e.g.*, averaged over a year) than over shorter exposures
5 (*e.g.*, over a single night). It is important for public health that noise impacts be
6 kept below levels understood to be harmful to health. Although noise from turbines
7 may have certain distinctive qualities (*e.g.*, amplitude modulation, tonality), there is
8 currently not enough evidence to determine whether or how much these qualities
9 could result in health-related impacts above and beyond that from the noise level
10 alone.

11 **Q. What are you recommending regarding certificate conditions for noise impacts**
12 **for Alle-Catt Wind?**

13 **A.** DOH Staff recommend that short-term regulatory limits for audible noise at non-
14 participating residences be included in the final certificate conditions such that the
15 long-term facility noise impacts at these receptors do not exceed the guideline of
16 45 dBA L_{den} recommended by WHO in their “Environmental Noise Guidelines for
17 the European Region” (“WHO 2018”).

18 **Q. Would you please provide more detail on the WHO guideline you are**
19 **referencing?**

1 **A.** WHO 2018, based on a systematic evaluation of scientific literature through 2014,
2 made a conditional recommendation that noise levels produced by wind turbines
3 should be below a day-evening-night-weighted annual average sound pressure level
4 of 45 dBA L_{den} outside of people’s homes based on the health outcome of long-term
5 annoyance. The 45 dBA L_{den} guideline was established as the level at which
6 approximately 10% of people hearing the noise would be highly annoyed, based on
7 an assessment of four studies examining the association between annoyance and
8 wind turbine noise for exposed populations in several different countries. The WHO
9 2018 guideline is the first noise guideline pertaining specifically to noise from wind
10 turbines published by an international authoritative body with health expertise. As
11 such, the guideline should be given considerable weight by the Siting Board as it
12 relates to the minimization or avoidance of adverse environmental effects of the
13 operation this facility.

14 **Q. Why did WHO 2018 consider long-term annoyance to be a health outcome?**

15 **A.** WHO 2018 defines noise annoyance as “a feeling of displeasure, nuisance,
16 disturbance or irritation caused by a specific sound.” As WHO 2018 noted,
17 “research into the relationship between noise exposure and its effects on humans
18 brings into focus several questions concerning the definition of health and the
19 boundary between normal social reaction to noise and noise-induced ill health.”

1 WHO 2018 also noted that, “physical health does not present a complete picture of
2 general health; and being undisturbed by noise in all activities constitutes an
3 asset worthy of protection. Therefore, ... [WHO 2018] regarded (long-term)
4 annoyance and impaired well-being...as health outcomes.” WHO 2018 states that,
5 “The importance of considering both annoyance and self-reported sleep
6 disturbance as health outcomes is further supported by evidence indicating that
7 they may be part of the causal pathway of noise-induced cardiovascular and
8 metabolic diseases.”

9 **Q. Is WHO’s reliance on annoyance as the basis of a guideline consistent with**
10 **accepted public health practice?**

11 **A.** The identification of annoyance as a health outcome by the WHO is consistent with
12 NYSDOH’s mission of protecting wellbeing of New Yorkers. Protection of public
13 health requires more than simply addressing health endpoints with an International
14 Classification of Diseases (ICD) code, and reflects a broader scope of practice
15 compared to clinical medicine. In public health risk-assessment practice, guidelines
16 are often established below known clinical effect levels, at or below levels
17 associated with outcomes that might be precursors of more frank effects. Thus,
18 basing a guideline on annoyance as indicator on a continuum of, *e.g.*, stress-
19 induced effects, is consistent with accepted public health practice.

1 **Q. Why did WHO 2018 choose the threshold of 10% highly annoyed as the basis of**
2 **the guideline rather than another percentage?**

3 **A.** WHO 2018 stated that it “would expect a general health benefit from a marked
4 reduction in any kind of long-term environmental noise exposure.” Studies that find
5 an association between noise (regardless of source) and annoyance generally have
6 found that a polynomial curve fit the data well. Such a curve does not include a
7 threshold beneath which there is no annoyance, and no studies that I am aware of
8 have reported observing a threshold. Therefore, any noise guideline would
9 correspond to some estimated non-zero percentage of people annoyed. WHO 2018
10 set the percentage of highly annoyed people for their annoyance-based guidelines
11 (for all sources evaluated) at 10%. As a comparison, for self-reported sleep
12 disturbance, which WHO 2018 considered a more serious health effect than
13 annoyance, guidelines (for sources other than wind) were based on 3% of the
14 affected population (being highly sleep deprived). To provide another comparison,
15 for cancer risk associated with chemical exposures, health protective guidelines are
16 commonly based on an incremental risk for cancer of one-in-one million.
17 Establishing guidelines for exposures without known thresholds beneath which
18 there is no risk using specific incremental risk targets (i.e., percentages of the
19 exposed population that could experience the health effect) are conventions

1 established by authoritative bodies. The incremental risk targets are set by the
2 authoritative bodies based on their assessment of the health outcome, their
3 expertise, and their professional judgement.

4 **Q. Is adoption of a guideline from another organization consistent with your**
5 **Department's approach to other environmental health risks?**

6 **A.** Yes. Although the Department examines original scientific literature and has
7 derived and established its own guidelines for some specific environmental agents
8 or exposures, it has also relied on other national or international public health
9 organizations ("authoritative bodies") such as the United States Environmental
10 Protection Agency (USEPA), the Agency for Toxic Substances and Disease Registry
11 (ATSDR), the WHO, Health Canada and others. DOH relies on assessments by the
12 authoritative body regarding the health effects of the environmental exposure, and
13 selects the health protective values or guidelines that are most scientifically robust,
14 defensible, current, and applicable to the exposure being evaluated.

15 **Q. Did you examine any other research, guidelines or standards?**

16 **A.** Yes, numerous peer reviewed research articles and several reports were reviewed
17 for other appropriate health-based guidelines. The USEPA, which was granted
18 jurisdiction over noise by the federal Noise Control Act of 1972, published a
19 guideline through its Office of Noise Abatement and Control (ONAC) for

1 environmental noise (55 dBA over 24 hours) based on speech interference.¹
2 Additionally, included with this guideline was a “model” noise control ordinance
3 which is still in use today. However, ONAC was defunded in 1981,² and the
4 guideline was never updated to address more recent available information.
5 Health Canada, in cooperation with Statistics Canada, conducted a large-scale
6 epidemiological *Community Noise and Health Study* in 2012. The study’s purpose
7 was “to support a broader evidence base on which to provide federal advice and in
8 acknowledgement of the community health concerns expressed in relation to wind
9 turbines.”³ That study assessed impacts of noise levels in a series of peer reviewed
10 papers in 2016.^{4,5} Annoyance was found to be the only effect significantly
11 associated with wind turbine noise up to the study maximum annual average
12 nighttime noise level of 46 dBA. For example, sleep disturbance was not

¹ USEPA. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. 550/9-74-004. 1974.

² Hammer MS, Swinburn TK, Neitzel RL. 2014. Environmental noise pollution in the United States: developing an effective public health response. *Environ Health Perspect* 122:115–119; <http://dx.doi.org/10.1289/ehp.1307272>.

³ Health Canada. Wind Turbine Noise and Health Study: Summary of Results. Ottawa, Health Canada, November, 2014. <http://www.hc-sc.gc.ca/ewh-semt/noise-bruit/turbine-eoliennes/summary-resume-eng.php>

⁴ Michaud DS, Feder K, Keith SE, Voicescu SA, Marro L, Than J, Guay M, Denning A, Murray BJ, Weiss SK, Villeneuve PJ, van den Berg F, Bower T. Effects of wind turbine noise on self-reported and objective measures of sleep. *SLEEP* 2016;39(1):97–109.

⁵ Michaud *et al.* Exposure to wind turbine noise: Perceptual responses and reported health effects. *J Acoust Soc Am.* 2016 Mar;139(3):1443-54. doi: 10.1121/1.4942391.

1 significantly associated with turbine noise in the study population. Health Canada
2 has not developed any guidelines from this study.

3 The NYS Department of Environmental Conservation (DEC), Division of Permits has
4 a policy guideline for permitted facilities in non-industrial settings of 65 dBA,
5 inclusive of "ambient noise," or an increase of 6 dBA over ambient noise.⁶ The
6 policy document refers to protection of health and minimizing complaint potential,
7 but cites no particular health basis. Several other reports and journal articles were
8 also reviewed. Overall, most recent assessments of environmental noise exposure
9 are in general agreement that annoyance and/or sleep deprivation due to night
10 time noise levels are the more sensitive endpoints from exposure to relatively low
11 levels (up to about 50 dBA) of environmental noise.

12 **Q. Why did you choose to rely upon the WHO 2018 Guidelines for noise associated**
13 **with wind turbines?**

14 A. The WHO is an established public health organization and authoritative body that
15 has conducted in-depth and relatively recent reviews of the literature on noise and
16 health. The WHO 2018 guideline is the most well documented, relevant and
17 defensible guideline established by a health-based authoritative body that is
18 available to evaluate noise from wind turbines. The Department is not aware of

⁶ NYS DEC. Assessing and Mitigating Noise Impacts. Division of Environmental Permits. Albany, NY. 2001.

1 any other authoritative bodies that transparently derived health-based guidance
2 levels for wind turbine noise by objectively reviewing available scientific
3 information.

4 Accordingly, the Department concluded that the WHO 2018 Guideline is currently
5 the most appropriate guideline for evaluating and minimizing impacts due to
6 environmental wind turbine noise and for the protection of public health in New
7 York State.

8 **Q. Are there limitations to the WHO 2018 guideline?**

9 **A.** WHO itself acknowledges the limitations of its 2018 conditional guideline for noise
10 from wind turbines, which was based on limited data, stating that the adoption of
11 this guideline requires a policy-making process with substantial debate and
12 involvement of various stakeholders. The Public Service Law Article 10 proceedings
13 provide a structure for substantial debate and involvement of stakeholders in the
14 siting process. With respect to this Application, such a debate could consider
15 factors other than annoyance levels in the population including the economic
16 viability of a project subjected to more restrictive noise guidelines.

17 **Q. Have any studies been published since WHO 2018's literature review concluded in**
18 **2014 that support or undermine the WHO 2018 guideline of 45 L_{den} based on 10%**
19 **of the exposed population being highly annoyed?**

1 **A.** The Health Canada study (*i.e.*, Michaud *et al.*, 2016, (HMS-2), Ex___; Michaud *et al.*,
2 2016 (HMS-3), Ex___), which was published after WHO 2018 concluded its wind
3 turbine noise review, reported significant associations between the percent of
4 highly annoyed residents and wind turbine noise levels. While the percentage of
5 highly annoyed study participants differed significantly by province, on average,
6 about 13% percent of those exposed to noise levels of 45 L_{dn} would be highly
7 annoyed (Figure 1 in Ex___, HMS-2). Michaud *et al.*, (2016) (Ex___, HMS-2) notes
8 that the L_{dn} , or the weighted day-night average noise level, is approximately equal
9 to L_{den} . Another study of an exposed population of 429 households in Finland
10 reported that noise annoyance was “significantly, albeit weakly, associated” with
11 noise levels (Ex___, Hongisto and Oliva 2017). This study concluded that the
12 exposure-response relationship in their study population “agreed strongly” to other
13 studies up to about 42 L_{den} . These other studies included the Health Canada study
14 and the studies that WHO 2018 would later rely upon (*e.g.*, Jansen *et al.*, 2011).
15 Based on Figure 6 of Hongisto and Oliva (2017), the high annoyance percentage at a
16 noise level of 42 dBA L_{den} was about 9-10%. High annoyance at 45 dBA L_{den} was
17 about 24%. Collectively, at comparable wind turbine noise levels, these additional
18 two studies reported significant associations and high annoyance levels which were
19 similar to, if not greater than, the annoyance levels reported by the four studies
20 upon which WHO 2018 based its 45 dBA L_{den} guideline. Therefore, I would interpret

1 these studies as supporting of the guideline of 45 L_{den} , and that the corresponding
2 estimate of the percentage of high annoyance in the population is not overly
3 conservative. I did not find any other peer reviewed studies published since 2014
4 that undermined the WHO 2018 guideline or showed that it was overly
5 conservative.

6 **Q. Are you proposing a specific short-term regulatory limit so that long-term noise**
7 **levels do not exceed the long-term guideline of 45 L_{den} ?**

8 **A.** DOH Staff recognize that an annual average noise limit like the L_{den} may present
9 challenges for compliance monitoring purposes. We are aware that Department of
10 Public Service (DPS) Staff have, on other wind project applications, proposed and
11 provided a technical basis for a short-term regulatory limit of 42 dBA Leq (8-hour)
12 for nonparticipating receptors to be protective of 45 L_{den} and comply with WHO
13 2018. We also understand that extrapolation from one noise metric to another for
14 a wind turbine source may be challenging and may involve some uncertainty.

15 **Q. Would the Applicant's proposed short-term regulatory limit of 45 dBA Leq (8-**
16 **hour) for non-participating receptors minimize health impacts to the maximum**
17 **extent practicable?**

18 **A.** The regulatory limit of 45 dBA Leq (8-hour) for non-participating receptors
19 proposed by the Applicant is consistent with the recommendations of DOH Staff in

1 Case No. 14-F-0490, prior to the release of WHO 2018, which was based on an
2 outdoor guidance value in Guidelines for Community Noise (1999) (“WHO 1999”).
3 WHO 2018 stated that its newer source-specific guidelines superseded the older
4 non-source-specific outdoor noise guidelines in WHO 1999. DOH Staff believe that
5 the Applicant’s proposed short-term regulatory limit for non-participating receptors
6 would avoid serious (*i.e.*, frank) effects on health. However, if compliance with it
7 would not prevent non-participating receptors from experiencing noise levels
8 above 45 L_{den} , as DPS has argued in other cases, the information provided by WHO
9 2018 suggests that the regulatory limit may not be sufficiently health protective
10 since more than 10% of those receptors would be expected to be highly annoyed.
11 DOH staff acknowledge that employing regulatory noise limits that are more
12 restrictive than those proposed by the applicant may reduce the energy output
13 anticipated for the facility (see certificate conditions in Eric Williams pre-filed
14 testimony) if the facility design cannot accommodate those more restrictive limits.

15 **Q. Can factors other than health risk be considered when establishing acceptable**
16 **maximum levels for environmental exposures?**

17 **A.** In the management of health risks such as those associated with environmental
18 exposures, other factors can play a role in decision making. For example, a decision-
19 making body can consider the feasibility of exposure reduction and the potential

1 benefits to a community or individuals that may offset risks. In the case of a wind
2 facility, “participating” land owners who enter into contractual agreements with
3 the wind facility owner stand to benefit economically from the siting of nearby
4 turbines. These benefits could be considered when setting certificate conditions
5 relating to this group. DOH Staff also recognize that this project, like all wind
6 projects, can convey important environmental and health benefits due to the
7 project's potential offset of air pollutant emissions from fossil-fuel-burning
8 facilities, particularly considering the potentially devastating long-term public
9 health consequences of global warming. These benefits could also be considered
10 when setting certificate conditions relating to any renewable energy facility. If
11 excessive noise restrictions were suffered by multiple applicants and facilities, it is
12 possible that these restrictive noise limits could make it more difficult for NYS to
13 reach its renewable energy goals with their associated public health benefits.
14 However, in NYS, there are currently several proposed wind facilities and
15 potentially more on the way, as well as proposed facilities using other renewable
16 technologies (*i.e.*, photovoltaic solar). If restrictive noise limits drive energy
17 production in New York to quieter wind farms or other forms of renewable energy
18 with lower potential for annoyance in the population, that may be a desirable
19 outcome with respect to public health. DOH staff are not in a position to judge
20 whether the more restrictive noise limits can be practically met by wind facilities,

1 although it is worth noting that Eight Point Wind (Case No. 16-F-0062) recently was
2 granted a certificate to operate with a certificate condition that noise should not
3 exceed 42 dBA Leq (8-hour). DOH staff are also not in a position to judge whether
4 meeting such a limit for all proposed facilities would significantly impact clean
5 energy production across the state and reduce associated state-wide and global
6 health benefits of that clean energy production.

7 **Q. What is your recommendation regarding “Shadow flicker”?**

8 **A.** Wind facilities also have the potential to annoy community members through, not
9 only noise, but visual impacts, including shadow flicker from rotating turbine blades.
10 The Health Canada study (Voicescu *et al* (2016), (HMS-6) Ex_____) reported a clear
11 and statistically significant association between minutes per day of flicker exposure
12 and annoyance with flicker. As maximum minutes per day of shadow flicker
13 exposure increased, the percentage of those who reported being highly annoyed by
14 shadow flicker increased from 3.8% at 0-10 minutes/day, to 5.2% at 10-20
15 minutes/day, to 13.5% at 20-30 minutes/day, to 21.1% at more than 30 minutes per
16 day. This suggests that even exposures as low as 20 minutes per day could result in
17 high annoyance levels at more than 10%.

18 The Applicant has proposed, as a certificate condition, a limit of 30 hours of flicker
19 per year for non-participating residences (Eric Williams, pre-filed testimony). This

1 limit has been adopted as a condition for another facility (Case No. 14-F-0490). The
2 *Wind Energy & Wind Park Siting and Zoning Best Practices and Guidance for States*
3 (NARUC 2012, (HMS-6) Ex____) recommends that shadow flicker “not exceed 30
4 hours per year or 30 minutes per day at any occupied building.” While the health-
5 based evidence for both of these recommended restrictions was very limited , the
6 Health Canada study has provided some additional evidence that restricting or
7 otherwise addressing the daily minutes of flicker be health protective because it
8 would reduce potential for long-term annoyance in the community. In the
9 proceedings for another facility (Canisteo Wind, Case No. 16-F-0205), DPS staff
10 proposed an additional certificate condition, “that shadow flicker mitigation be
11 required for any non-participating residence where the owner submits a complaint
12 regarding shadows and expected shadow exposure from the Facility exceeds 30
13 hours per year or 30 minutes per day.” As we note in our letter in lieu of brief for
14 that case regarding DPS’ recommendation, absent complaints, the applicant is not
15 burdened by the requirement of meeting the 30 minutes per day limit at all
16 nonparticipating receptors. Therefore, the certificate condition requirements
17 proposed by DPS in that case seem reasonable, and DOH staff supports them for
18 Alle-Catt Wind as well.

19 **Q. Does this conclude your testimony?**

20 A. Yes.