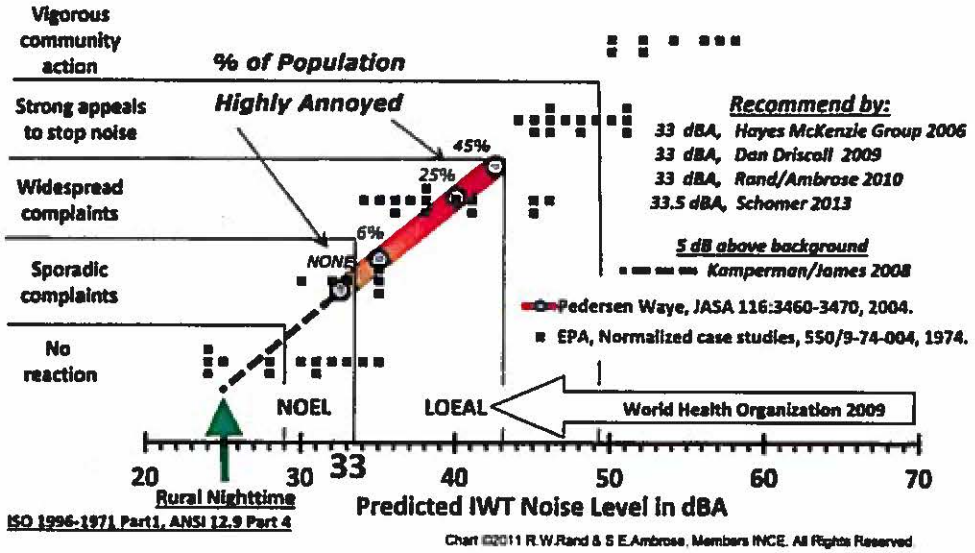
4/4/12 TBV 114 NOWLOUT

The USEPA methodology adjustments [2] (Appendix D) were applied to reduce urban noise levels (Ldn 55, 55 day/45 night) to predict rural public responses, as shown below.

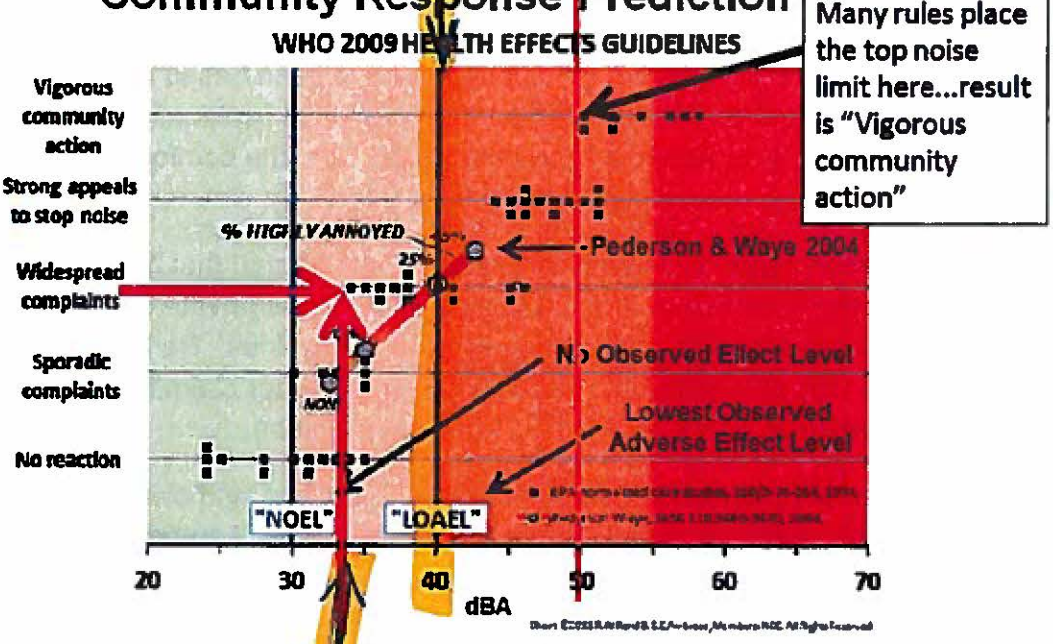
Predicted Community Reaction
For Wind Turbines in a Quiet Area
and Percent of Community Highly Annoyed



2 Adjustments Table D7; year round; 0, quiet rural; -10, no experience; -5, tones & impulsive; -5, Ldn to Leq; -6.

SOURCE: Steven Ambrose, INCE (207) 892-6691

HEALTH EFFECTS BEGIN @ 40 dBA



Widespread Complaints Start at 33.5 dBA !!

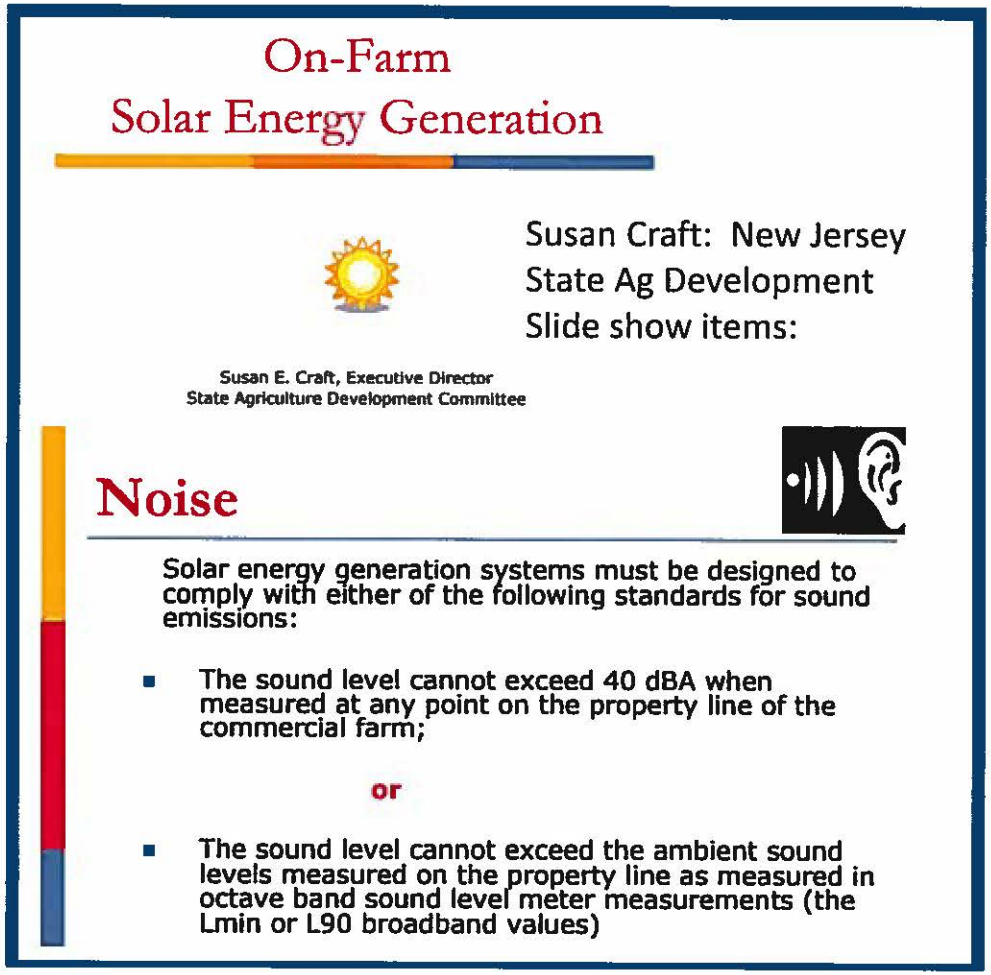
SOURCE: Steven Ambrose, INCE (207) 892-6691 with Ted Hartke notations 217.840.1612

HARTKE PAGE 3

WIDESPREAD COMPLAINTS BEGIN @ 33.5 dBA

4/4/18 Hostile Handout

Boone County Illinois solar inverter and wind turbine noise research findings:



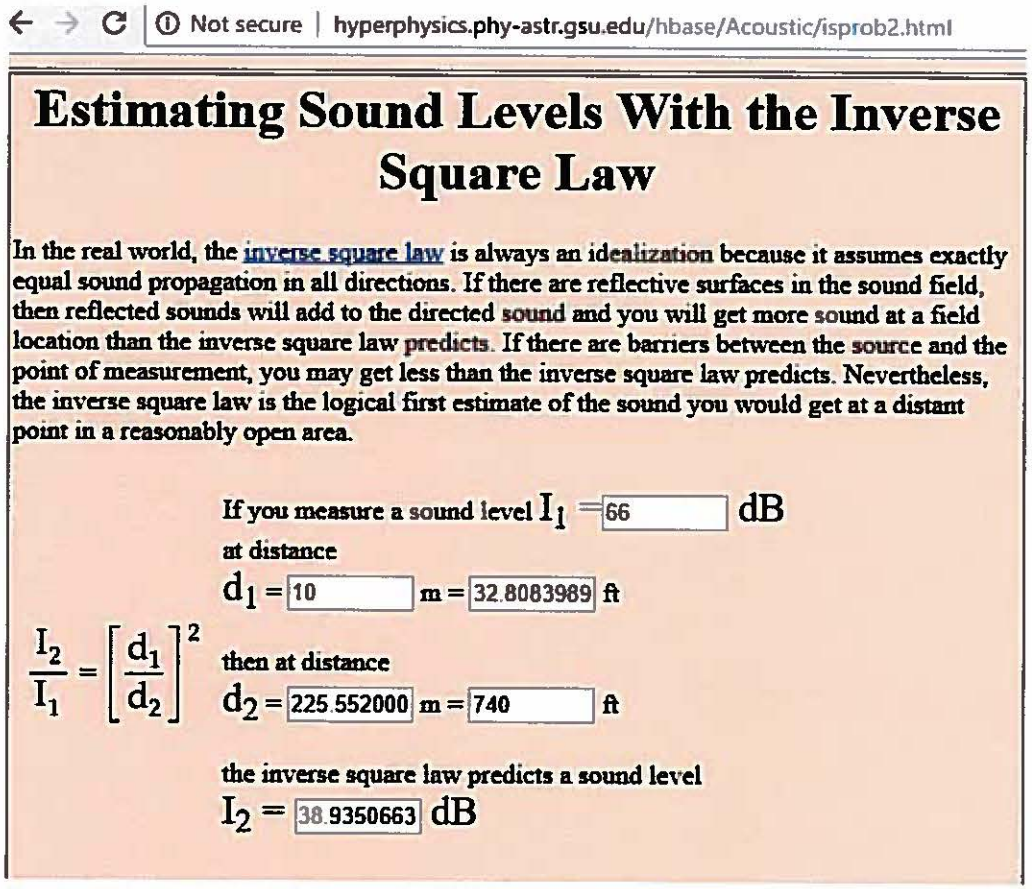
- The Chinese Sungrow inverter manual (model stated in Borrego's site use permit set) states: "Do not install the inverter near residential areas. Noise can be produced during inverter operation which may affect the daily life.
- http://de.sungrowpower.com/upload/product_file/16/a698ebfd05e494305b5dfcac24f833c1.pdf

Dr. Paul Schomer's criterion

- *The nature of DNL is that if the DNL is based on a sound level that is constant over the entire 24 hour day, that sound level is 6 dB lower than the DNL level that it calculates to.*
- *For example, a constant, 24 hour level of 39 dB calculates to a DNL = 45 dB. (ANSI, ISO)*
- *The results are that **the nighttime level and, indeed, the 24 hour level at most should be ≤ 39 dB,** and it is not unlikely that the correct limit is lower than 39 dB.*
- *A constant level range from 24-39 dB equates to a DNL range from 30-45 DNL.*

8/9/18 Hartke handout

Reasoning to change location of inverters to 500' from the perimeter fence :



Not secure | hyperphysics.phy-astr.gsu.edu/hbase/Acoustic/isprob2.html

Estimating Sound Levels With the Inverse Square Law

In the real world, the inverse square law is always an idealization because it assumes exactly equal sound propagation in all directions. If there are reflective surfaces in the sound field, then reflected sounds will add to the directed sound and you will get more sound at a field location than the inverse square law predicts. If there are barriers between the source and the point of measurement, you may get less than the inverse square law predicts. Nevertheless, the inverse square law is the logical first estimate of the sound you would get at a distant point in a reasonably open area.

If you measure a sound level I_1 = 66 dB

at distance

d_1 = 10 m = 32.8083989 ft

$$\frac{I_2}{I_1} = \left[\frac{d_1}{d_2}\right]^2$$

then at distance

d_2 = 225.552000 m = 740 ft

the inverse square law predicts a sound level

I_2 = 38.9350663 dB

Inverters for huge solar farms as planned for Champaign County emit 66 dBA of noise level at 33 feet.

Effects of outdoor audible sound:
-Almost no significant effects predicted at 39 dB or lower (World Health Organization)
-Sharp increase in adverse health effects predicted in the 40-55 dB range (World Health Organization)

Adverse health effects begin at 40 dBA. (Accoustician Steven Ambrose community response chart)

For solar panel inverters to NOT HARM neighbors, the solar panel inverters should be placed 740 feet from unleased property.

(Illinois Pollution Control Board regulations control technical aspects of noise measurement, complaint rules, and protocol.)