## Environmental Assay Inc.

Wide-spectrum Environmental Services Indoor Air Quality / Electromagnetic Fields



30 November 2018

Sandra Garagekey 142 Sumer Lawn Dr. Ipswich PA 11176

Dear Sandra,

This is a letter to clarify some concepts presented in the report I sent out 3 October 2018, following my visit of 14 September 2018. Mainly this will attempt to expound on Harmonic Distortion known in the "popular" culture as "dirty" electricity. The monicker "dirty" is used, with the guise the measuring person has some "filters" to sell you, and predictably uses measuring devices that provide numbers (*meaningless in the legitimate scientific community*) that drop when some of these "filters" are plugged in. As you recall I emphasized that I do not call it "dirty," because I have no interest in selling you "filters" of questionable value.

The main import of the electric utilities in North America is to provide 120V (*or other voltage*) at 60 Hz (*Hertz, or cycles per second*), with a minimal level of Harmonic Distortion / waveform irregularity. The Harmonics in this case are multiples, or echoes as it were, of 60 Hz. Cutting to the chase, the electric utilities will go to great lengths to provide you 60 Hz, and nothing else. In a manner of speaking this is "squeaky clean" power. Although negative biological interactions are associated with this presence alone, it can additionally be negatively tainted by the presence of significant Harmonics. That's because the Harmonics are capable of producing other negative biological interactions that greatly expand the negative impact of 60 Hz alone.

As indicated in my report, and at right, I documented the waveform and frequency spectrum of your Electrical System Ground (ESG) relative to unaffected soil. The Waveform is quite distorted, and the Frequency Spectrum reflects severe Harmonic distortion greater than 100% relative to 60 Hz, the first peak on the left. However, since this was occurring on the ESG, which was at about 150 mV (*milliVolts*)



relative to unaffected soil, this is of little concern relative to <u>the 120 V presence</u>, <u>whose</u> <u>emissions indoors are about 1000 times greater</u>, <u>since you have Romex wiring throughout</u>.



The above is the Waveform and Frequency Spectrum of the 120V 60 Hz as detected via the Electric Field in the living spaces. Note that the 60 Hz is now easily distinguishable on top, the "lazy S" pattern, but is nonetheless riddled by higher frequency distortion. If you were to count the irregularities riding on each cycle of the 60 Hz waveform, you might add up perhaps 20 to 30 or so, per cycle of 60 Hz. This would imply there is a high frequency presence of between perhaps 20x60 to 30x60, or rather 1200 to 1800 Hz. Strangely enough, there is a peak on the frequency spectrum at about 1600 Hz (1.6 kHz), within the bounds calculated. This may be due to any number of "high frequency" switching power supplies, a.k.a. **SMPS. The distortion in this case is about 25% to 30%, using the height of the 1600 Hz compared to the 60 Hz.** This was taken at 3:13 pm on 14 September 2018, and is shown in my report.

Distortion figures are identified per criteria from IEEE (*Institute of Electrical and Electronic Engineers*) Std 519-1992, **IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems**, where it is stated that **any one Voltage Harmonic greater than 5% of the 60 Hz presence is out of spec**, and / or **the aggregate of all relevant Voltage Harmonics greater than 8% of 60 Hz are out of spec**. There is also a statement therein that **although the electric utility is responsible to provide "clean" Voltage**, the user is **also responsible to not demand Current in too nonlinear fashion** (*as this "taints" the Voltage*), and **as a corollary shown herein, to not create Voltage distortion to begin with and then try to feed that into the public power system.** Such actions can negatively affect neighboring users, putting the electric utility in the spotlight, trying to mend problems created by uninformed consumers.

The vertical scales are not shown, but you should be aware that the Waveform span on the graph in this page is about 10 times that on the previous page, not 1000 times, due to apparent cancellation because of different polarities of the 120V residential system, the latter expounded elsewhere on <u>www.emfrelief.com</u>.



The above, also of the 120V 60 Hz, was captured at 3:33 pm on 14 September 2018, a few minutes after the Solar Inverter had been brought online, and as shown in my report. Note the upper portion of the graph and realize the 60 Hz waveform is still there . . . somewhere, but is now much harder to discern. Trying to discern the additional frequencies by the waveform alone is now impossible, and most consultants, being unaware of these investigation techniques, choose the easier path of using a meter that displays some number, and subsequently sell you some "filters." So it becomes a matter of ambiguous or vague discussion, at best, between consultants as to whose "filter" or meter is better. Using this technique, I can cut through the BS, and arrive at legitimate statements relevant to the matter at hand. You can note the Inverter internal oscillator frequency group, being somewhere in the 16 kHz (*16,000 Hz*) range, not previously present. This is about 250 times faster than 60 Hz, impossible to discern from the waveform, or any "dirty" electricity meter, but still clearly within the human audio hearing range. **The Harmonic distortion is about 60% of 60 Hz, and well out of spec**. That is, comparing the height of the Inverter frequencies to the 60 HZ from the electric utility.

While numbers on a meter, or statements provided by a vendor are open to interpretation / verification, this display is not. In the truest meaning of "a picture is worth a thousand words," this is so, and much more.

You can delve into conjecture that this new distortion is due to the interaction of nonlinear devices, and the inverter, causing some EMF "black hole." If that were so, weird electrical interactions might occur with large regularity, including house fires. But this is not the case, so the Inverter alone is the cause of the Harmonic Distortion. This is coupled to the breaker panel, and thus all neighbors fed off the same transformer, since this is a grid-tied system,

making a local problem a neighborhood problem, despite statements from the inverter manufacturer to the contrary.

With some enterprising "consultants," I can foresee someone eager to alert the neighbors to new "dirty" electricity, and try to sell "filters" to them. If you see your consultant leaving your house, and going to the neighbors, that should give you a clue that something's up. Well, these carrion consultants wouldn't really do that . . . it's too obvious.

Had this been a home wired with Armored / BX / MC wiring, or Wiring in Metallic Conduit (*all these options only really available during new construction, or extensive renovation*), these emissions would have been irrelevant, because they are reduced to those from the ESG, which is about 1000 times smaller. Localized emissions, however, will still be strong at energized power cordage. This can become a localized intense source of emissions / irritation at a computer workstation, due to the many power cords. These can be replaced with Shielded cordage to eliminate those emissions. When fed off a power strip, that too can be replaced with a Shielded Cord and Strip, eliminating that as a source of emissions.

While we can debate human irritating potential until we turn blue, or purple, some sensitive electronics are "smoking gun" indicators of a distorted waveform. I have a HiFi amplifier that would not work at a relative's home. When "gifted" to me, thinking I could "fix" it, I simply plugged it in and enjoyed its output. Another visiting relative saw it, liked it, and asked for it. Being magnanimous, I gave it away, only to have it returned some weeks later, because it did not work at this other relative's home. Again, I simply plugged it in, and it worked fine. Coincidence? I think not.

For those who may wish to consider the human biological impact, the Frequency Spectrum diagram below may be worth considering.



While Harmonics are multiples of, and thus faster than the fundamental (*60 Hz in N. America*), frequencies slower than 60 Hz also occur due to the apparent modulation of the Harmonics, that is visible in real time when monitoring them. Since the human eye's persistence is about 30 Hz, those "modulations" are slower than 30 Hz, raising disturbing possibilities, perceptions, and biological ramifications.

We did this to ourselves . . .