nervous system irritants, causing pain, seizures, perception of earthquakes, sleep disruptions, etc.

Radio Frequency / RF alternating fields may lead to Tumorgenesis. In many cases the endpoint is death, with pain and anguish along the way. These are not my conclusions, but of those quite more eminent and skilled than I. Why have we accepted these as normal? Or have we? Skillful marketing has been a powerful force in making these conveniences accepted. With undesired side effects occurring to a minority, the promoters have decided what is an acceptable risk. If you are that impacted minority, no effort after-the-fact, can make you whole. Awareness may lead you to conclude that what is acceptable for you may not be what others deemed acceptable for you. If so, **no cost, or low cost options can reduce your risk significantly.** This document aims to provide avenues of reduction, and educating the technical workforce best suited to assist you, when needed, in achieving those goals. If this succeeds even only in part, the result will have been well worth the effort.

Irritation, of any form, given long-enough duration, and / or sufficient strength, will cause disease. Thus any irritation is a precursor to disease.

In some circles I am a Building Biologist, in others a Council Certified Indoor Environmental Consultant, in yet others I am derided because I may not be tactful, and when I get tired of the BS I am even less so. Still far from being a master of my universe . . . I inspect people's homes for indoor environmental issues and when I can, propose solutions. Some might call me a "house doctor." Perhaps one of several.

> *In this capacity, I was asked by a man to investigate his apartment for Magnetic fields, after having acquired a field meter, noting strong fields, and being concerned for his son due to his recent brain tumor removal.*
>
> *When I arrived, I confirmed the readings and determined it was due to a wiring error. The apartment was served by two breaker panels, and one circuit was wired such that its source was in one panel, and its return in the other.*
>
> *Not only was this a health concern for his son's impaired immune system, but a hidden safety hazard for anyone doing electrical work, and in violation of the NEC (National Electric Code). Some circuit tracing and rewiring was required.*
>
> *Unfortunately, the uninformed mother dismissed the possibility of interaction, and was most uncooperative in trying to get the matter resolved, preventing resolution.*

In the above story, the ailing subject was a minor, subject to the direction of adults, so that the child was powerless. That's even more sad, because that child has a hopefully long life ahead, now possibly complemented by enduring suffering, due to denial of those entrusted to care for him. My heart aches for him, but my hands are tied.

Surgery, of whatever kind and necessity, hampers the immune system, usually rendering it unable to return to the same functionality and immunity as previously. Some environmental exposures can produce the same result. This weakens the immune system of those involved, and predisposes them to interactions with their environment previously thought of as pseudoscience.

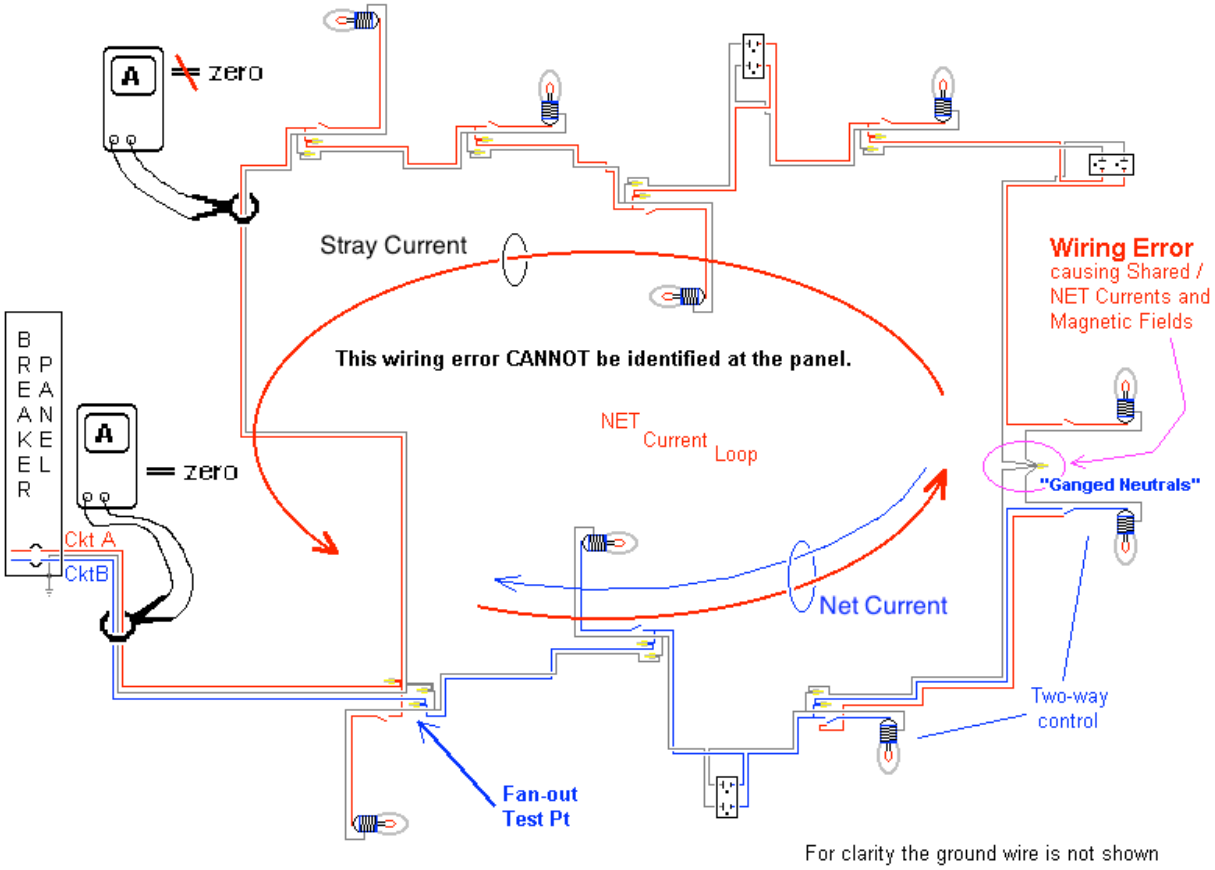
> *On a separate venture I learned of a one month child that had relocated with his family, and within one week had developed a maximum sleep cycle of one hour. So every night the parents would alternate in picking him up, lulling him back to sleep, to repeat the cycle one hour later.*
>
> *When I came to visit, eight months later, the child was still locked into the one hour sleep cycle. Fortunately the parents had not taken him to a doctor to determine the nature of the problem, and possibly prescribe medicine. His sleep area consisted of a crib, with a standard metal-spring mattress, next to a wooden chest, with a TV and VCR on top of it, whose power cords were strung next to the crib, and plugged in immediately near it. I surmised that his mattress' proximity to the wiring had caused it to become energized, and in turn energizing the child.*
>
> *I suggested relocating the crib away from the power cords, if only to reduce the field, as there would still be wiring in the walls. This was done, and within a week, the child acquired an eight-hour sleep pattern.*

Immaturity, likewise to surgery, makes the immune system especially vulnerable to many things environmental.

Some extreme sensitivity may be developed to chemicals, thus the MCS (Multiple *Chemical Sensitivity)* group. Some may be developed to electromagnetic fields, thus the EI / EHS, ES (Electrically *Ill, Electric Hypersensitivity, Electrically Sensitive)* group. Some in each group educate themselves out of necessity for survival, despite the naysayers in their circles, social or familial. Some deny sensitivity to anything other than what they feel informed about. Reality, however, is more complex, and anyone with an impaired immune system will be sensitive in some varying degree to both chemical and electromagnetic contributions from their environment.

Contents

will be balanced, and not a source of wide-area fields. Measurement there with a clamp-on amp probe will always yield zero results.

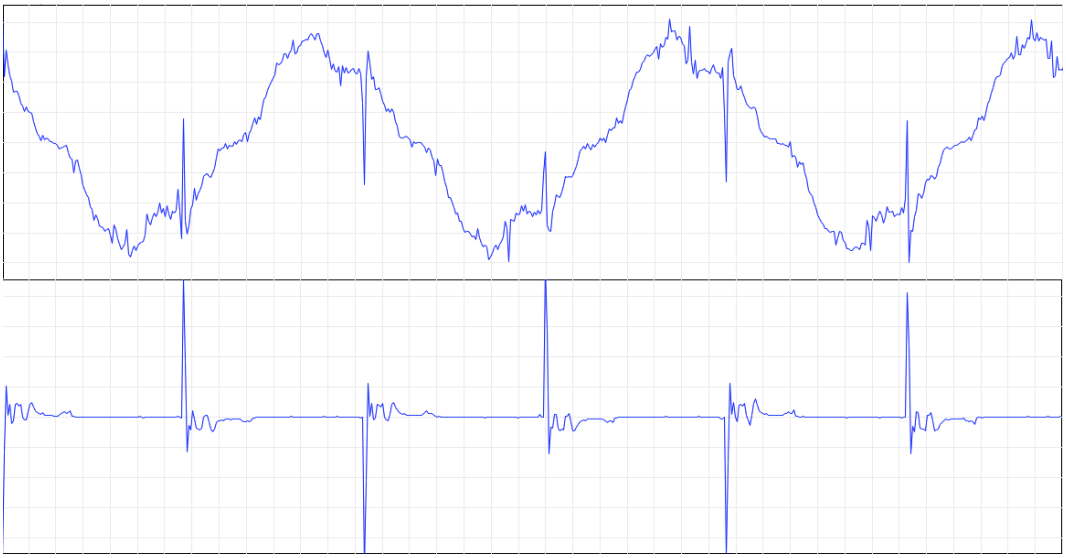


The one shown above, also a Neutral-to-Neutral wiring error, can only be traced from the "fan-out" test point. That is, the point where the 12/3 or 14/3 wiring, designated as a "home run," or three-wire circuits, splits into two 12/2 or 14/2 cables, the most common, and designated as two-wire circuits. 12/3 or 14/3 wiring is often used as a matter of economics, because in the mind of the installing electrician, a foot of wire saved means more money in his pocket. However, that "savings" is a handicap, because the fan-out location is usually not marked, and the troubleshooter needs to locate it first, before initiating signal injection and tracing. That is because testing for neutral-to-neutral wiring errors at the panel will not identify this as a problem, since the error occurs after the 12/3/ or 14/3 wire splits into 12/2 or 14/2. Three-wire circuits are also equivalent to sub-panel feeds, and testing from the main panel you can identify Neutral-to-Ground as occurring in any sub-panel circuit, but not Neutral-to-Neutral errors beyond the sub-panel.

One frequency in, one frequency out. These are tangibly detected and viewed in real time via an oscilloscope and a frequency spectrum analyzer.

When they occur on power systems for living / working spaces, there are certain details to consider. One is that the voltage on that power system is expected to, and must remain within a small and narrow margin from its original value to be of any use. A second consideration is that the fundamental frequency of the voltage provided must remain unchanged, and within even more stringent limits. In North America 60 Hz is prevalent. One usefulness of having the same and very stringently limited frequency is that power systems can be paralleled for increased power capacity, or interconnected to share and funnel power hundreds of miles from the source generator to the end user, possibly you.

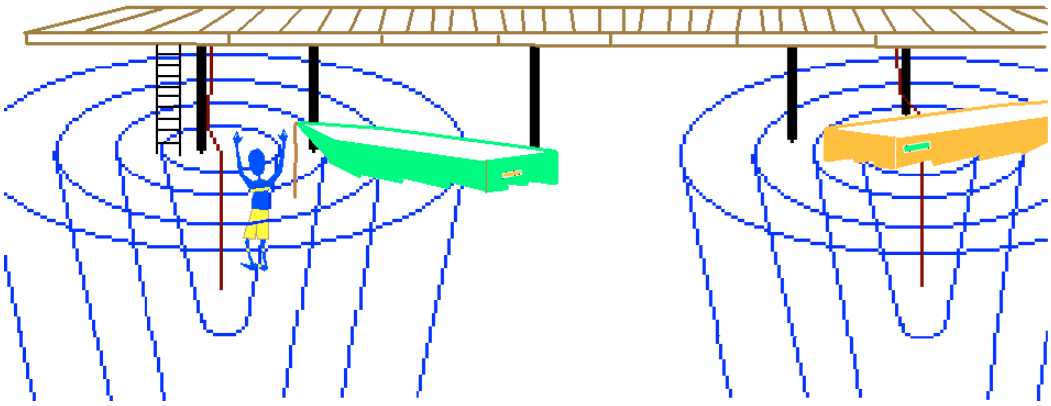
When harmonics occur on these power systems, they cause distortion to the voltage, to usually no more than 5% of the voltage's amplitude / intensity. That is because within the constraints of the specific design, i.e. 100 Amp service v. 200 Amp service, you should be able to turn everything on, and still have about 120 V. In contrast, the current can easily have as much as 100% or more distortion from the voltage waveform provided. This distortion is defined by the presence of harmonics and their amplitudes.



Shown above top is the applied voltage, and below it the resulting current from a nonlinear load, such as a fluorescent lamp. Note the coincidence of distortion on the voltage waveform with the pulse of current, and subsequent oscillations, on the bottom half.

Note there is already distortion on the top half from a variety of sources. The graph shows about 50 ms / milliseconds on the upper half, and since each cycle of 60 Hz power takes about 16 ms, you see about three cycles. Realize that the alternating power system has two pulses of power per cycle, that is, one current pulse on the negative swing, and one on the positive swing. Since each triggered fluorescent light emission lasts more than 8 ms, it does not drop

however, an entirely different mechanism takes place. For instance, if someone is in the water, they are now immersed, not only in water, but in a current distribution system that does not belong on a human or animal, and aside from continual whole-body shock while immersed, can be deadly. Depending on the type of primary power distribution used, WYE or Delta, amps of current may be sinking into the soil / water despite any local usage of power. Of course this does not exclude local wiring errors that are causing this. The same testing processes as described herein will indicate the magnitude of the problem.



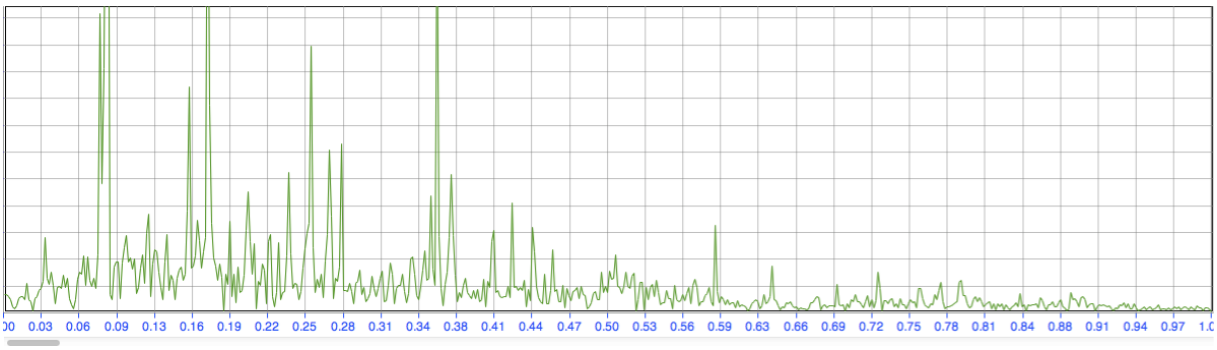
Immediate solutions are: 1) proper grounding on the customer side, and 2) neutral isolation from the electric utility by the utility, or 3) customer-owned isolation transformers designed specifically for this at higher cost, and generally aimed at the marine sector. This will make any voltage buildup on the local ground under scrutiny a local phenomenon, not one based on multiple customer usage patterns from miles around. These changes will reduce the ground / grounding current flow from amps to possibly milliamps. Unfortunately, however, if the situation is in a dense residential neighborhood, neutral isolation will only eliminate one's individual contribution, which may not reduce the ground / grounding current circumstance by much.

Electrical system ground connection with water can be especially deadly, as it’s not obvious that current can be flowing into the water sufficiently to kill, when the contact is the electrical ground reference, which is supposed to be at zero volts, or very close to it.[23] A rule of caution is that if there is anything metallic nearby, whose structure you cannot see in its entirety, as not being connected to anything else, it needs to be considered as electrified and possibly deadly. While this may restrict your sense of safety, losing your life by accident, thinking something does not need to be considered as to its “safety,” would be most unfortunate.

[23] **Two California Teens Die of Electrocution During Canal Dog Rescue,** By Tom Ozimek April 3, 2019, https://www.theepochtimes.com/two-california-teens-die-of-electrocution-during-canal-dog-rescue_2864714.html

because they can occupy the audio range frequencies, and extend well into genuine RF. Additionally, due to the eccentricities of the electrical / electronics involved, harmonics are nonlinear in amplitude (and *when viewed in real time appear to be modulated),* and occur for every pulse of power, so they are not continuous, but rather pulsed at the rate of twice the source frequency (two *pulses of power per cycle)*.

On Harmonics, Magnetic field emissions within automotive passenger cabins are rich in the audio frequency range. Shown is a Ford Transit 250 at 2000 RPM / 70 MPH, to 1kHz.



There was little above 1 kHz. Telephone systems historically conveyed 300 to 3500Hz. This produces an Electric field emission from its wires, when in use. Power System harmonics (Magnetic or Electric) are also richest in the lowest audio frequencies, slower than 5 kHz. So I submit that the audio frequencies are of most relevance, and you can equip a common laptop with free software to use its sound card as an oscilloscope and spectrum analyzer for testing. A princely prize for peanuts. Yet there are some individuals, even some with engineer credentials, that suggest only frequencies faster than 4kHz are relevant, and further suggest monitoring to the hundreds of kHz. In reality, anything faster than audio frequencies, becomes a carrier of audio frequencies by way of modulation, so the offending frequencies (0 to 4kHz) are presently directly or indirectly. Then, they want to sell you "filters." Well meaning, perhaps, but vultures to the bone. If this document educates you so that you are not "taken" by one of those promoting the term "dirty electricity" and their plug-in cures, it will have been well worth it, for you.

Radio Frequencies (RF) are another zoo of entities. They can produce thermal (heating) effects, as well as resonance effects, so they too can be said to have nonlinear or "windowing" properties. Compounding the issues with RF, modulation of the RF can cause effects related to the modulation alone, or synergistic effects of the combined presence of RF and modulation. RF by its lonesome appears to be a causative agent of tumor formation. Peculiarly in the same region where individuals preferentially use, or store, their phone, such as one side of their head or a hip pocket.[25] While the medical "professionals" and business like to refer to these as "benign

[25] Of special importance is that mobiles can produce the effects when in active use, or in standby.