Soft Lights Foundation

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BY EMAIL

Public Health
City of Hamilton, Ontario
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Re: Spatially Anisotropic Visible-Radiation Devices

Dear Public Health and City Housing,

Biological systems have a long history of evolution with *light*. The substance emitted by the sun, stars, fire, candles, and fireflies is *light* and is a fundamental component of biological life. Humans use their visual receptors to see objects using reflected light, the different wavelengths of light provide color information, and *light* controls circadian rhythms. *Light is spatially isotropic radiation in the human visible portion of the electromagnetic spectrum*.

Light Emitting Diodes are misnamed because they emit visible radiation, but not light. LEDs should more properly be named Visible Radiation Emitting Devices or VREDs. The substance emitted by LEDs is spatially anisotropic visible radiation. Because the substance emitted by LEDs is not light and is directed-energy radiation, LED radiation interferes with the nervous system and can cause eye damage, pain, epileptic seizures, migraines, psychiatric trauma, and thoughts of suicide.

We wish to alert City Housing to liability issues related to the installation and operation of LED radiation devices. Figure 1 is a diagram that shows that light is spatially isotropic radiation in the human visible portion of the electromagnetic spectrum and that the radiation emitted by LEDs, while visible, is not light.

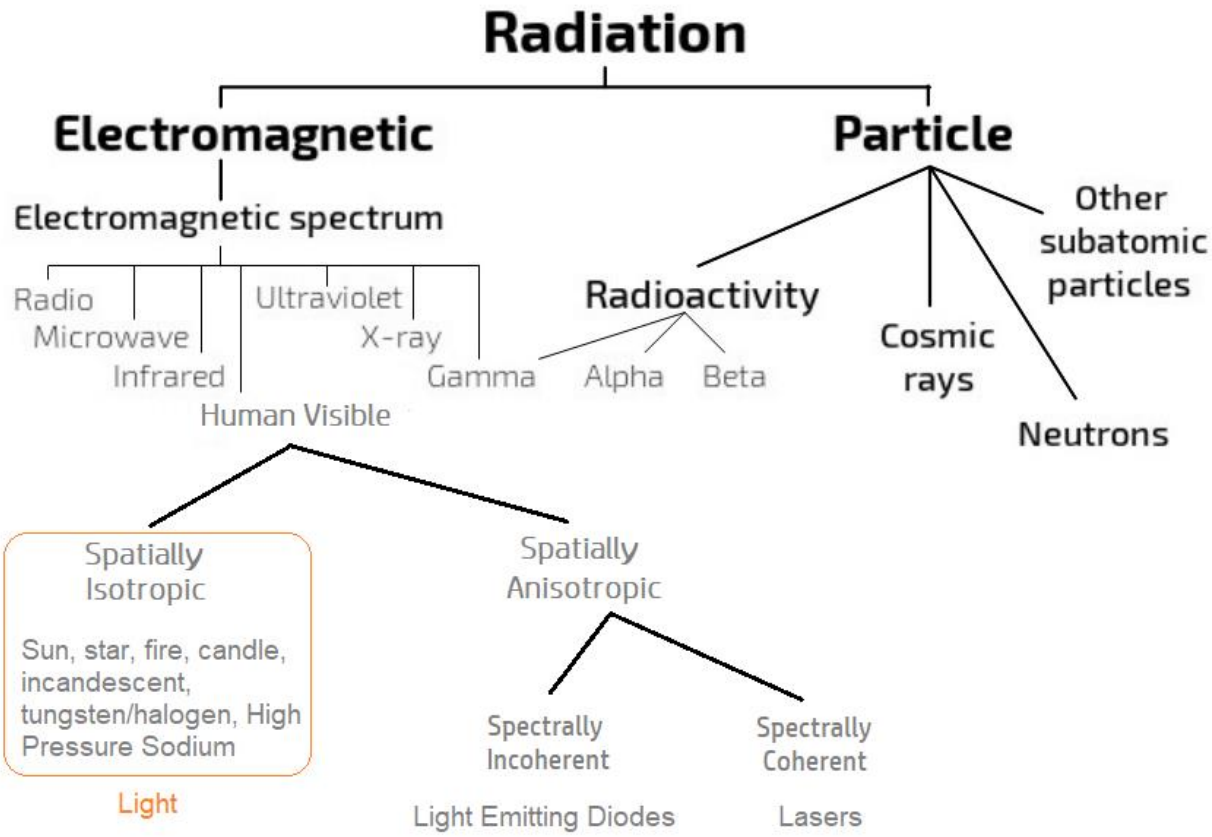

Figure 1 - Radiation

Figure 2 shows LED radiation devices that were installed at 980 Upper Ottawa Street that subject persons in the area to unregulated, toxic, hazardous, and discriminatory visible radiation. As is clear from the photo, citizen's civil rights are being violated because the radiation is being directed into their eyes and damaging the natural night resource that is fundamental to the proper functioning of all biological systems. LEDs emit spatially anisotropic radiation that is visible, but this radiation is not light.

Figure 2 –980 Upper Ottawa Street

The Illuminating Engineering Society Recommended Practice for Design and Maintenance for Roadway Parking Facility Lighting (IES RP-8-18) is the de-facto standard for outdoor lighting for streets and parking lots. Section 2.1 of this document states, "Radiant energy that is capable of exciting the retina and producing a visual sensation is consider *light*." This definition is inaccurate, as it is missing the words "spatially isotropic", even though the contents of IES RP-8-18 assume the radiation to be spatially isotropic. The references to *light* in IES RP-8-18, therefore, are for *spatially isotropic radiation in the visible portion of the electromagnetic spectrum*. The word *light* in IES RP-8-18 does not refer to microwaves, x-rays, or spatially anisotropic radiation such as LEDs and lasers.

The reason this is important is because City Housing has installed LED radiation devices that do not comply with existing standards, emit toxic and hazardous radiation, discriminate against persons with disabilities and have unregulated spatial, temporal, and spectral characteristics. LED radiation devices have been shown to cause pain, sickness, eye damage, seizures, migraines, emotional trauma, and thoughts of suicide.

The Illuminating Engineering Society does not guarantee their own standards and disclaims any liability for the use of their standards. Thus, if City Housing claims that they followed standards for LED radiation devices and are therefore not liable for the harms caused by LED radiation devices, City Housings's claim will fail, both because IES RP-8-18 is not applicable to LED radiation devices, and because IES has warned that their standards are not trustworthy enough to be guaranteed or relied on.

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To our knowledge, there are no ocular exposure standards for LEDs. In his 2009 presentation, Senior Engineer Michael Shulman of Underwriters Laboratories wrote, "Currently, neither the U.S. nor Canada have mandatory standards or regulations for ocular exposure to LEDs emitting incoherent visible light."[1] In the research article, titled Light Emitting Diode Induced Retinal Damage[2] the authors state, "*Excessive LED light exposure presents a potential hazard to retinal function.*" In other research, those in Risk Group 3 (those with epilepsy, autism, migraines, photophobia, etc.) are often purposely ignored during the research, invalidating results that might have shown that LEDs are safe.

LEDs are not “energy efficient”. To be energy efficient, a technology must provide the same quality of service and perform the same task as the previous technology[3]. The task in this situation is to provide *light* and uniform illumination while using less energy and not causing harm. Since LEDs do not emit spatially isotropic radiation, LEDs do not emit light, and the radiation that LEDs do emit is not uniform. Instead, LEDs emit spatially anisotropic visible radiation that is sending people to the hospital, causing eye damage, and violating civil rights. The claim of “energy efficiency” by the LED lighting industry is fraudulent.

As an example of how dangerous LED radiation is, consider this warning shown in Figure 3 from the company Gear Light.

[1] http://www.softlights.org/wp-content/uploads/2021/10/MichaelShulman_LEDFireElectricalSafety.pdf
[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5313540/
[3] https://www.energystar.gov/about/about_energy_efficiency

Figure 3 - LED Flashlight

The fact that LEDs emit unregulated visible radiation and lack standards, cause sickness and eye damage, interfere with the human nervous system, and discriminate against people with disabilities makes Hamilton liable for the harm and discrimination they cause because Hamilton has installed and operates LED radiation devices.

To protect human health and reduce liability, City Housing must protect the natural night resource and limit visible radiation. Any lighting must be fully shielded (not just full cutoff) and use the subset of spatially isotropic electromagnetic radiation known as *light* with a Correlated Color Temperature of 2700 Kelvin or less, with 2000K preferred to protect the natural night resource.

Sincerely,

Mark Baker

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President
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