

Dirty Electricity: An Invisible Pollutant in Schools.

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“As the school year began in the late summer of 2002, Mindoro Elementary School teacher and principal Angela Olstad was ready to call it quits,” wrote Emily Winter in her article, “Dirty electricity at center of debate” that appeared in the August 2, 2006 issue of the *Capital Times* in Madison, Wisconsin.

“Since Olstad took the job at Mindoro three years earlier, she suffered from chronic illness and was eventually diagnosed with multiple sclerosis in April 2002. Other faculty members reported health problems as well, and 37 Mindoro students had developed asthma.

Even after treating the school twice for mold, rampant illness persisted and its source remained a mystery.

"I was exhausted. I absolutely had no life for three-and-a-half years," Olstad said. "I was afraid to go back."

But all that would change in October 2002” continued the article.

In October 2002, the Superintendent, Ron Perry, invited a power quality expert, to measure the school for electrical problems. He found elevated levels of high frequency radiation on the wires in the school (commonly referred to as *dirty electricity*) and installed Graham Stetzer filters to remove these high frequencies. The staff knew that an electrical contractor was working in the building but were unaware of what work was being done. Within days they began to notice marked improvements in their health.

In a letter posted on the website www.electricalpollution.com, Char Sbraggia, district nurse, documented some of these improvements after the GS filters were installed: “Teachers are stating they are less fatigued and tired The students seem to have more energy and appear and seem less tired Several staff who doctored regularly for allergies have not had to take medication or see their doctors because they are having less problems Students whom have been diagnosed with migraine headaches have had their headaches reduced, no headaches at all.”

But perhaps the most impressive and most objective result was for students with asthma. Of the 37 students who required nebulizer treatments daily, 3 students used inhalers only for exercise-induced asthma before physical education classes after the filters were installed.

Two years later the results were the same. Absenteeism, due to illness, was reduced and students continued not to need inhalers and to have high energy. According to the district nurse Sbraggia in a follow-up letter on Jan. 14, 2005, “We are a much healthier school since the filters have been installed.”

The Wisconsin Department of Health no longer classified the school as a “sick” building and the lawsuit, initiated by the teachers’ union, was dropped.

Is the Mindoro school unique? No! The problem at the Mindoro school was *dirty electricity* generated by fluorescent lights, computers, and typical office equipment like photocopy machines - equipment that is present in most North American schools.

Toronto School

I became aware of dirty electricity in 2003, when I was invited to do a study at a Toronto private school for students from Grade 1 to 12 with learning disabilities. A parent concerned about her daughter’s health and education initiated this study.

Scientific studies have repeatedly documented an increased risk of childhood leukemia associated with exposure to elevated magnetic fields. For this reason, it is advised that schools not be built near high voltage transmission lines, sub-stations or transformers and that computer stations be reconfigured to minimize student exposure to magnetic fields. The Toronto school did not have high magnetic fields but did have high levels of dirty electricity.

Dirty electricity is a power quality problem that the utilities are concerned about because of the damage it does to sensitive electronic equipment, hence the need for computer surge suppressors. The GS filters are powerful surge suppressors that reduce dirty electricity in the 4 to 100 kHz range. According to Guy Leavitt, Superintendent Blair/Taylor School District: “We did have a number of electronic failures in the district prior to installing the [GS] filters. Since installing them, we have eliminated nearly all of these types of failures. Over the three year period we may have saved in the range of \$40,000.”

I was unaware of studies showing that dirty electricity was harmful to human health so I was skeptical that filters would alleviate the health problems in the school. I agreed to do the research because even a negative result has value in a scientific study.

We designed a wellness questionnaire based on an abbreviated list of symptoms common in radio wave sickness or electrical hypersensitivity. Electrical hypersensitivity (EHS) is defined by the World Health Organization in 2004 as: “*a phenomenon where individuals experience adverse health effects while using or being in the vicinity of devices emanating electric, magnetic, or electromagnetic fields....EHS is a real and sometimes a debilitating problem for the affected persons.*” Teachers completed this questionnaire at the end of each school day documenting their energy, health, mood, performance and another questionnaire documenting the behavior of students in their last class of the day. This single blind study lasted 6 weeks.

To my surprise both teachers and students improved while the filters were installed. Teachers were less tired (50%); less frustrated (45%); less irritable (35%). They had better health and more energy (30%) while the filters were installed. During this period they had a greater sense of satisfaction and accomplishment, were more focused, and experienced less pain.

Student behavior also improved especially in the elementary grades with the filters. Fewer students were late for class. It took less time to start class and less time was spent unproductively. Students were better able to focus, they were more active, less disruptive, and needed instructions repeated less frequently. Symptoms often associated with ADD or ADHD were the behaviors that improved while the filters were installed.

Attention Deficit Disorder (ADD) is one of the most common behavioral disorders of childhood - it accounts for two percent to 18 percent of school-aged children - and is increasing at an alarming rate. As of 1996, 2.4 million children in the United States were diagnosed with ADD/ADHD, up from 950,000 just 6 years earlier according to the University of Maryland School of Medicine, in 2002.

An important question that needs to be address is “Is dirty electricity in homes and schools contributing to ADD and ADHD?”

Minnesota Schools

The results for the school in Toronto intrigued me and we repeated it at an elementary, middle and high school in Minnesota in 2005. A total of 45 teachers participated in this study and, because a new meter became available (a microsurge meter) we were able to get more detailed information about the dirty electricity in each classroom with and without the GS filters.

Approximately 40% of the teachers improved after the GS filters were installed compared with placebo filters. This effect was statistically significant. Elementary student behavior also improved significantly during this period. High school student behavior did not change except in the computer labs where the highest amount of dirty electricity was recorded before filters were installed.

Conclusions

I am convinced that dirty electricity is contributing to ill health of staff and students; that elementary-aged students are the most sensitive; and that this form of pollution may be significantly compromising the learning and teaching environment in schools. Dirty electricity refers to an electrical signal that deviates from a normal 60-Hertz sine wave. It is generated by modern electronic equipment that isn't properly filters, by equipment turning on and off and by arcing on electrical wires. Dirty electricity is a ubiquitous pollutant that has long been known to damage sensitive electronic equipment. Its effects on human health are just emerging.

Dirty electricity is a power quality problem and is likely to be present in most schools since they have fluorescent lights, computers, and other electronic equipment that generate dirty electricity. Our studies show that young children seem to be the most sensitive to dirty electricity and their

behavior in the classroom improves when this pollutant is removed. Many of the behavioral traits that disappear are those we associated with ADD and ADHD. Students with asthma and teachers with allergies also improve when dirty electricity is reduced in school. Sick building syndrome has been associated with poor indoor air quality but recent evidence suggests that dirty electricity may be a significant contributor to this phenomenon.

Although more research needs to be done, monitoring schools for electromagnetic pollution is an important first step to determine the extent of this pollutant in the school environment. Schools with high absenteeism due to illness are good candidates for initial monitoring. Cleaning up the problem is much less costly than removal of mold and may be a good first step in dealing with sick building syndrome at schools.

Although this article deals exclusively with dirty electricity, another form of electromagnetic pollution that needs to be addressed is radio frequency radiation from wireless technology. The major difference between these two forms of energy is that dirty electricity flows along wires and wireless RF, as the name implies, flows through the air. Antennas on or near school property, wireless computers, wireless microphones in classrooms to help the hearing-impaired all expose students and teachers to radio frequency radiation. The long-term consequences are poorly understood because our exposure to this technology is so recent. The few studies that are available suggest multiple health and biological effects near telecommunication antennas including cancers, symptoms of radio wave sickness, and impaired learning in schools.

My recommendation is to err on the side of caution. We need to monitor schools for all forms of electromagnetic pollution and to mitigate exposure where levels are high. The health of students and teachers is too important to ignore. Monitoring and mitigating electromagnetic pollution in schools improves the school environment and reduce ill health and educational difficulties.

Symptoms of radio wave sickness

Neurological: headaches, dizziness, nausea, difficulty concentrating, memory loss, irritability, depression, anxiety, insomnia, fatigue, weakness, tremors, muscle spasms, numbness, tingling, altered reflexes, muscle and joint pain, leg/foot pain, “flu-like” symptoms, fever. More severe reactions can include seizures, paralysis, psychosis and stroke.

Cardiac: palpitations, arrhythmias, pain or pressure in the chest, low or high blood pressure, slow or fast heart rate, shortness of breath.

Respiratory: sinusitis, bronchitis, pneumonia, asthma.

Dermatological: skin rash, itching, burning, facial flushing.

Ophthalmologic: pain or burning in the eyes, pressure in/behind the eyes, deteriorating vision, floaters, cataracts.

Others: digestive problems; abdominal pain; enlarged thyroid, testicular/ovarian pain; dryness of lips, tongue, mouth, eyes; great thirst; dehydration; nosebleeds; internal bleeding; altered sugar metabolism; immune abnormalities; redistribution of metals within the body; hair loss; pain in the teeth; deteriorating fillings; impaired sense of smell; ringing in the ears.

Common sources of Radio Waves (wired and wireless)

Outdoors: Broadcast and cell phone antennas; radar; cell phones; pagers; two-way radios.

Indoors: Cordless telephones and their base units; wireless computers and their base units; wired computers; televisions; microwave ovens; dimmer switches; security systems; remote controls; fax machines; answering machines; assistive listening systems and devices for the hearing impaired; wireless microphones; variable speed motors, transformers, child monitors, electric utility “smart meters,” signal-broadcasting smoke alarms, some electronic games.

Vehicles: CB radios, ignition systems, mobile radar units.

The original symptoms listed below was published in “No Place To Hide” Volume 3, Number 1, April 2001, “Special Issue on Russian and Ukrainian Research” by Arthur Firstenberg, Editor of The Cellular Phone Taskforce