

**Report to Michigan Oversight Committee of Michigan Legislature
December 2, 2014**

I, Donald Hillman, Ph.D., Professor Emeritus, Animal Science, Michigan State University, have helped over 100 farmers with problems from stray voltage and together with co-authors have proven (peer reviewed, **See Exhibit 1**) that the Michigan Public Service Commission and the power companies measure only Vp (Voltage peak) current, not Vp-p (Voltage peak-peak). Therefore they miss half or more of the radiation (**See Exhibit 2**).

My first experience with Smart Meters was in April of 2012 when a farmer who had been involved in 2 Stray Voltage Court Cases, winning both, and who suffers from Thyroid Cancer came to my home and told me of his soon-to-be granddaughter who would be fine at her grandmother's home in Haslett, MI, but became erratic when in her own playroom & bedroom in Ferndale, MI. He asked me if I thought it might be "Stray Voltage." I was ill at the time, so I told him to take my measuring instruments and filters and find out! The little girl's thyroid according to Beaumont Hospital had become inactive! This case was reported in my article, **Effects of Extraneous Electricity on Dairy Cattle, Other Animals, and Humans - A Guide for Dairymen, Veterinarians, and Investigators of Stray Voltage** (**See Exhibit 3**). It has been peer reviewed, and is In Print by **SciTechnol** in their Journal of Veterinary Science & Medical Diagnosis. Recently during an educational meeting on Smart Meters at the Hannah Community Center in East Lansing, Michigan, I measured 1208 G-S frequencies and demonstrated filtering with a G-S Filter as used in Exhibit 3.

Since my retirement from Michigan State University in 1982, I have been continually called to measure dirty electricity. It has been hard on my health, I have had 2 quad-ruple by-pass surgeries, diabetes, surgery on both eyes for pressure build-up, prostate cancer, a stroke, and cancer on the lower eyelids of both eyes. My stroke occurred while measuring radiation, October 23, 2012, from Smart Meters at 4 homes in Ann Arbor, MI.

I worked with Attorney General Michael Moody in MPSC Case # 11684 and his briefs and exceptions to Judge Nickerson were excellent. He reported the problem accurately, but the MPSC voted him down. Attorney General Bill Schuette has "argued that residential customers should be given a meaningful and fair opportunity to opt out of having a smart meter installed without being penalized by unwarranted and excessive charges." (**See Exhibit 4**)

Finally, the American Academy of Environmental Medicine has been studying and treating the effects of the environment on health for over 50 years and have prepared a Human Health Position Paper Summary (**See Exhibit 5**). Please read it and take the required action to make our State more healthy by your prompt action!

Respectfully submitted,



Donald Hillman, Ph.D.



Relationship of electric power quality to milk production of dairy herds – Field study with literature review[☆]

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HIGHLIGHTS

- ▶ Dairy cows were sensitive to earth currents from neutral-to-ground circuit outlets.
- ▶ Clamp-on ammeters on grounded-Y down grounds give quick current readings.
- ▶ Harmonic distorted voltage affects cows' behavior, health, and milk production.
- ▶ Peak-to-peak current must be measured for full impact of current on production.
- ▶ IEEE standards should include harmonic current effects on human and animal health.

ARTICLE INFO

Article history:

Received 8 November 2012

Received in revised form 21 December 2012

Accepted 22 December 2012

Available online xxx

Keywords:

Transients
Harmonics
EMF voltage p-p
Power quality
Milk production
Dairy farms

ABSTRACT

Public Utility Commissions (PUC) in several states adopted 0.5 volt rms (root mean squared) or 1.0 milliamperere as the actionable limit for utilities to respond to complaints of uncontrolled voltage. This study clearly shows that the actionable level should be reduced to 10 mV p-p (peak-to-peak), which is 140 times less than the current standard. Dairy farmer complaints that animal behavior and milk production were affected by electrical shocks below adopted standards were investigated on 12 farms in Wisconsin, Michigan, and Minnesota. Milk production per cow was determined from daily tank-weight pickup and number of cows milked. Number of transient events, transients, voltage p-p, waveform phase angle degree, sags, and sag-Vrms were measured from event recorders plugged into milk house wall outlets. Data from 1705 cows and 939 data points were analyzed by multiherd least-squares multiple regression and SAS-ANOVA statistical programs. In five herds for 517 days, milk/cow/day decreased – 0.0281 kg/transient event as transient events increased from 0 to 122/day ($P < 0.02$). Negative effects on milk/cow/day from event recorder measurements were significant for eight independent electrical variables. Step-potential voltage and frequency of earth currents were measured by oscilloscope from metal plates grouted into the floor of milking stalls. Milk decreased as number of 3rd, 5th, 7th, 21st, 28th, and 42nd harmonics and the sum of triplen harmonics (3rd, 9th, 15th, 21st, 27th, 33rd, and 39th) increased/day ($P < 0.003$). Event recorder transient events were positively correlated with oscilloscope average V p-p event readings. Steps/min counted from videotapes of a dancing cow with no contact to metal in the barnyard were correlated with non-sinusoidal 8.1 to 14.6 mV p-p impulses recorded by oscilloscope for 5 min from EKG patches on legs. PUC standards and use of 500-Ohm resistors in test circuits underestimate effects of non-sinusoidal, higher frequency voltage/current common on rural power lines.

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1. Introduction

Uncontrolled electric current injected into the earth in a Grounded-Wye Distribution System (commonly called "Stray Voltage"), NEV (neutral-to-earth voltage), N-GV (neutral-to-ground voltage), or tingle voltage has been the subject of controversy between dairy farmers.

[☆] There are no conflicts of interest. No funding has been received for any part of this work.

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where exposure may be lifetime, constant, variable in magnitude and frequency, and sunken resources are limited.

Increases of primary neutral current flow into the grounded neutral network (I_{PA}) by primary neutral current from a neighboring farm and primary neutral current from on-farm loads was described by Gustafson and Cloud (1982). Secondary neutral current due to unbalanced on-farm loads, interconnection of equipment and circuit neutral conductors, wiring faults, poor connectors, improper use of neutral conductors, and tree branches brushing power distribution lines may each contribute to increased neutral-to-earth transient and harmonic currents in the livestock environment.

Results of the present study confirm a 1980 report that low-level neutral-to-ground voltages and transients are a significant problem in some milking areas. And, jumpiness, kicking, refusal of some cows to enter the milking parlor, and reduced milk production are some manifestations of the problem (Gruesenmeyer, 1980).

Polk (2001), one of the science advisors to the Minnesota Public Utilities Commission, using the science advisor's data (Hoben et al., 1998) shows considerable scatter of milk/cow/day when step voltage was less than 0.01 V (10 mV), but a linear relationship between milk/cow/day and step voltage above 9 mV. He noted that when one considers only the V-lu (voltage at low electric use) above 9 mV the correlation coefficient between milk/cow/day and V-lu becomes +0.994. However, because of the small number of farms, 3 over 9 mV, the *P*-value becomes 0.069. Also, on three farms where step voltage was 9 mV or larger, the value of milk/cow/day decreased linearly with soil resistivity to current. Results of the present study, when number of transients, frequency of impulses, and the number of harmonics per day are considered, support the position of Polk that 10 mV peak to peak is a critical voltage level on some farms.

Exposure of cows under controlled laboratory conditions to a 10 kV/m, 60-Hz electric field and a uniform horizontal magnetic field of 30 μ T (microtesla) for 28 days, has shown physiological effects that are potentially adverse (Burchard et al., 1998, 1999). Burchard et al. (1998) found a significant increase in quinolinic acid and a trend towards an increase in tryptophan in cerebrospinal fluid consistent with a weakening of the blood-brain barrier due to exposure to the electric and magnetic fields. Burchard et al. (1999) also found decreased concentrations of magnesium and increased concentrations of calcium and phosphorus in blood plasma and decreased concentrations of iron and manganese in cerebrospinal fluid of dairy cows and heifers exposed to 60 Hz, 10 kV/m electric fields, and 30 μ T magnetic fields. Milk decreased 5.97%, fat-corrected milk decreased 13.78%, milk fat yield decreased 16.39%, while feed dry matter intake increased 4.75% during 28-day reversal trials with 16 mid-lactation cows at McGill University, Quebec, Ca (Burchard et al., 1996). Groups were alternated: 1st period current Off-On-Off, 2nd period On-Off-On for each 28-day period so cows were exposed for 84 days, total. Results were different than a previous trial during which milk fat was higher from exposed cows compared to unexposed. The large difference in fat secreted in milk by exposed cows has not been explained (Burchard et al., 1996). However, fat secretion in milk from electrically charged cows was lower than from unexposed controls in four of five experiment-station reports of effects of electricity on dairy cows (Gorewit et al., 1992; Aneshansley et al., 1992).

Observations in the present study indicate that step-potential cow-contact current in milking stalls was sufficient to cause cattle to lift their feet to avoid electric shock from the floor or ground, and to decrease milk production without contacting metal, e.g., water bowls, feeders, or stall pipes. Thus, the assumption that cows are affected by electricity because they are repelled from shocks on water bowls and metal feeders, etc., may be true. But, the present data also reveals that ground currents that were conducted, or coupled, through feet and legs without touching any metal objects affected behavior (stepping) and milk production. This concurs with reports that rats exposed to 150 V/cm electric fields reduced water consumption,

gained less weight, and had lower levels of cortisol in blood in 9 of 10 trials, although exposure was through the air, and water was not connected to electric circuits (Marino et al., 1977).

In contrast, blood cortisol of cows increased temporarily upon exposure for a few minutes during or near milking (Stray Voltage Symposium, 1984; USDA, 1991). Effects on changes in blood adrenal steroids over long periods of exposure and a wide range of frequencies as found on farms have not been reported but may cause pituitary-adrenal fatigue as in Addison's disease or other impairment of health.

Recent discovery of the effect of external electric fields on membrane harmonic oscillations, caused by ions whose collisions with the membrane surface influence properties of a single lipid chain may be key to understanding electrical effects on cattle (Wojczak and Romanowski, 1996). Cows depend on microbial fermentation of ingested feeds to supply acetic, propionic, and butyric acids for energy and for formation of milk fat. Electrochemical effects of modulated VHF fields on the central nervous system (Bawin et al., 1975) may help explain the significance of cerebrospinal fluid protein and electrolyte (calcium ion) modifications by electric fields in dairy cows (Burchard et al., 1998, 1999). Autonomic nervous system response, such as epinephrine reducing blood flow through the udder of cattle under stress (Appelman and Gustafson, 1985; Lefcourt and Akers, 1982; Stray Voltage Symposium, 1984) could explain reduced milk production but has not been adequately investigated in relation to electrical shock (Hillman, 2002).

A review by California Health Services Department prepared for the PUC, reveals human health risks from electric and magnetic fields from power lines in the home or workplace (Neutra et al., 2001). Chen et al. (2000) reported that ELF (extremely low frequency, 60 Hz) inhibition of differentiation of Friend erythroleukemia cells was dose dependent on electromagnetic exposure; and because ELF inhibits the same enzyme in-vitro as phorbol esters, phenobarbital and dioxin, it falls in the same class of carcinogens that proliferate but do not cause cancer. Human colon cancer cells increased six-fold during exposure to electromagnetic fields in-vitro (Phillips et al., 1986). Electrical exposure disturbed melatonin secretion patterns in blood by the pineal gland (Burch et al., 2000), increased brain cancer and leukemia among electrical workers (Loomis and Savitz, 1990; Thomas et al., 1987), increased leukemia in children (Loomis and Savitz, 1990), and decreased T lymphocytes in power plant workers (Nakata et al., 2000) indicating a wide range of physiological pathological conditions have been related to EMF exposure. A higher rate of suicide among utility electricians and linemen than utility workers not employed in those jobs, suggests increased risk of mental depression and disturbed sleep patterns upon chronic exposure to low frequency electromagnetic fields (Van Wijngaarden et al., 2000), and further suggests electric field or electromagnetic field involvement with central nervous system functions (Bawin et al., 1975).

4.5. Power quality test meter with true RMS volt peak-peak

Power quality problems such as harmonics, sags, or swells involve distortion of the sine wave. The correct measurement tool for a power quality problem must accurately measure the characteristics of a total distorted sine wave (Graham, 2002, 2003, 2006).

In 1994, the Wisconsin SVAT (Stray Voltage Analysis Team), made the choice that a SVAT investigation would include only V_p (not V_{p-p}) readings (Dasho et al., 1994); and this decision was adopted by the WI Public Service Commission as well as by Minnesota and Michigan's Public Service Commissions. All three states' utility commissions measure with instruments such as the SVM-10 and Waverider, adjusted to read only peak (not peak to peak) values, thus missing half of the distorted wave form, giving a false reading. Since the Midwest USA utilities' voltmeters do not read peak-peak values, they use "average peak" readings, missing the distorted waveforms, and report 25 to 50% below True RMS readings as published in Power Quality

Primer (Kennedy, 2000, pp. 180–184). A FLUKE® 105B Scopemeter Series II instrument was used in our 12-farm study; and it recorded voltage, amperage, and frequencies of the complete sine wave. According to Aneshansley, "The combination of equal amounts of 60 and 180 Hz with different phase shifts and their lack of sensitivity to DC bias indicates that cows are sensitive to peak-to-peak voltages and not peak or rms" (Reinemann et al., 1999).

Many "stray voltage experts" including Public Service Commissions, government officials, and utilities may need to update their measurement techniques and knowledge of measuring tools. Use of a True RMS clamp-on ammeter to measure AC and DC current on the PN-E (primary neutral-to-earth) down-ground at the transformer pole is a simple method to determine the source and magnitude of the grounded-Y (Wye) utility's contribution to primary and secondary neutrals of the electrical system.

Use of a 500-Ohm resistor in the volt meter test circuit for power quality effectively eliminates from consideration the electrical power line harmonics, radiofrequency, and microwave measures that were found to be harmful in this study and may give misleading or unreliable information to investigators and herd owners. Studies of the effects of various electrical frequencies and harmonics on animals and humans and the physiological processes affecting behavior, health, reproduction, and productivity deserve further attention.

Resistance on a circuit can be measured with an Ohm meter and need not depend on inaccurate hypothetical 500-Ohm resistance. Appleman and Gustafson (1985) reported that 94.6% of cows were sensitive to 4 mA or less current. Norell et al. (1983) demonstrated that for a mouth-to-all-hooves pathway, 10% of cows had a resistance $R = 244 \Omega$ (Ohm) and 90% had Resistance = 525 Ω . "In this case, 10% of the cattle exposed to 1.0 V mouth-to-all-hooves shock would receive a 4.0 mA or greater shock; whereas 90% of cattle would receive a 1.9 mA or greater shock." Norell reported that specific avoidance responses were exhibited 13.8% of the time at 1.0 mA of current. Significant increases of response rates occurred for each 1.0 mA increment comparison up to 4.0 v 5.0 mA paired test, namely: 2.0 mA = 30% response; 3.0 mA = 69.2%; 4 mA = 92.3% response, and 5.0 mA = 98.4% response (Appleman and Gustafson, 1985, p 1558).

4.6. Subsequent research and related studies

4.6.1. Water drinking reluctance behavior

Dairy heifers decreased water consumption 32% when the water trough was charged with 3.0 volts and reduced water consumption 52% when the troughs were charged with 6.0-V, 60-Hz power line current compared to no current (Craine, 1969; Craine et al., 1970).

Cows were reluctant to drink water at all the farms we tested. They exhibited "lapping with the tongue," a sign of testing the water and reluctance to drink. Since water consumption is mandatory for milk production and good health in animals, it most probably contributed to the demise of many herds.

The observation that cows were reluctant to drink water on farms reporting stray voltage and decreased milk production led to our measuring current (20–40 mA p-p) in the water on farms reporting stray voltage in Michigan. We found that milk production decreased as transient, harmonic, and rf (radiofrequency) currents increased, and as step-potential voltage increased daily. We were not able to find any North American agricultural literature reporting the relevance of rf and MW (microwave frequency) currents to dairy cow behavior, health, and milk production prior to our study (Hillman, 2008, 2012; Hillman et al., 2011a, 2011b) and believe more research on this topic is necessary.

Scientists have observed that the fundamental physical composition of water can be changed by weak alternating magnetic fields at the cyclotron frequency combined with a weak, static dc field (Zhadin, 2010; Del Giudice and Giuliani, 2010). Similar findings were reported by Abraham R. Liboff, while working at the U.S. Naval Medical Research Center in Bethesda, MD, and later as a physics professor at

Oakland University Rochester, MI (Liboff, 1985; McLeod et al., 1987) and Carl Blackman, at the U.S. Environmental Protection Agency (EPA), Washington D.C. (Blackman et al., 1985). Liboff reported that the inorganic nutrients: calcium, potassium, and magnesium became immobile in the water in experiments with mice.

Cows that are genetically capable of producing over 100 lb (50 + kg) milk daily require about 70–100 grams or more of calcium secreted in milk daily. If ingested calcium, potassium, and magnesium are immobile in the metabolic system during electromagnetic exposure, Liboff's theory may explain periparturient hypocalcemia (so-called milk fever), rumen stasis, displaced abomasums, and impaired uterine recovery from infections permitting failed reproduction and mastitis post-calving, as well as decreased water consumption and milk production.

4.6.2. Water lines frequently carry EMF into homes as well as barns

In 2004, the Lansing Board of Water and Light, Lansing, MI, found high levels of electric current entering the Hillman home and installed a dielectric coupling on the waterline to stop the electromagnetic fields from entering the home (Hillman, 2007).

Similar reports of EMF on water lines have been reported by Wertheimer et al. in studies from 1979 to 1995 (Lanera et al., 1997) and by Stetzer (2001) in his video, *Beyond Coincidence – The Perils of Electrical Pollution*.

4.6.3. Harmonic distortion on farm power lines and on substations

Our observations that harmonic frequencies generate elevated levels of current on the neutral wire of a grounded-wye distribution system concur with reports of harmonics on utility substations and farm power lines. Tran et al. (1996), an Engineer of PSI Energy, Inc., Plainfield, IN, et al., reported that "Triplen harmonics, particularly the 3rd, add in the neutral and have little diversity between loads. The higher neutral currents may cause significant problems. Neutral to earth voltages will increase near the substations which could increase stray voltage complaints. ... This paper provides fundamental understanding of triplen harmonic influence on stray voltage and EMF related to multi-grounded wye electric distribution systems." Tran made reference to USDA Publication 696 for stray voltage problems on animal farms; but USDA Pub. 696 contains no information about harmonics nor frequencies other than 60 Hz.

Similar to Tran's findings, Kansas engineers, measured electric power harmonics, 2nd through 63rd, on five rural substations and seven farms in Kansas, where maximum THD_j ranged from 8.2 to 34.2% on farms (Li et al., 1990). Gustafson et al. (1979) in response to farmer's complaints, recorded 83 harmonics near a DC transmission line in Minnesota.

4.6.4. Radio-frequency interference on power lines

The coupling of external electromagnetic fields to transmission lines was described by Albert A. Smith, Jr., a Senior Engineer for IBM Corporation. The effect of induced currents can range from noise on communication lines and errors in digital circuits to equipment damage and even personnel hazards. Some of the more well-known sources of electromagnetic fields include nearby lightning strikes, AM, TV and FM broadcast stations; radars; industrial, scientific and medical (ISM) equipment; automobile ignitions; personnel electrostatic discharge; the esoteric nuclear electromagnetic pulse (NEMP); and power supply noise and switching transients inside electronic equipment (Smith, 1989). Smith's book illustrates causes and consequences of shielding circuits, spacing of transmission cables, and IEEE references to research.

4.6.5. Health and reproduction impaired by EMF exposure

Cows and other animals exposed to electrical stress over long periods of time develop an analgesic effect, docile, unresponsive to stress, and may not exhibit a physical reaction to electrical charges. This opioid effect results from accumulation of dopamine in certain

sections of the brain. It is excreted in the urine and has been used as a marker for electrical stress when other sources of stress are controlled (Brown et al., 1991; Buchner and Eger, 2011; Milham and Stetzer, in press).

Failed reproduction was a common impediment of dairy herds afflicted with extraneous electricity. Induction of lymphopenia, a common result of electropathic stress, caused luteal dysfunction in cattle (Alila and Hansel, 1984). Retained CL (corpus luteum) on ovaries is a common cause of failed estrus in dairy cows (Kristula et al., 1992). Failed conception of experimental cows subjected to electricity was often overcome by administration of prostaglandins F2 alpha (Lutalyse) to cows not pregnant by 50-days post-partum in complete lactation electrical exposure experiments (Gorewit et al., 1992). Lutalyse, which removes the CL, causes estrus within 120 hours, and may have biased experimental effects of voltage on evidence of estrus and reproduction in some experiments (Shaw and Britt, 2000).

Displaced abomasums and rumenitis associated with poor muscle tone in cattle were common on farms with uncontrolled voltage and is comparable to the ulcers and gastro-intestinal pain as recognized symptoms of electropathic stress in humans and other animals (Selye, 1950, 1951; Rea et al., 1991; Dahmen et al., 2009).

Exposure to weak EMF resulted in deformed embryos and offspring in laboratory animals (Delgado et al., 1982; Moh'd-Ali et al., 2001) and abnormal chick embryos (Juutilainen et al., 1987). Mutations of salmonella microbes exposed to weak 100-Hz fields could account for the more common outbreaks of uncommon diseases and also raises questions about the effect of EMF on the health of ruminant microbial populations. Exposure of cows to low-level EMF resulted in alteration of circadian rhythms and some leukocyte differentiation antigens compared to unexposed cows (Stelletta et al., 2007).

Dairy cows on farms and dogs in commercial breeding-for-research kennels failed to conceive when induced current from near power lines was found on the metal cages near Kalamazoo, Michigan (Marks et al., 1995). Exposure to induced current increased length of estrus and progesterone content of blood in cows during 28-day exposure periods (Burchard et al., 2003). Repeated acute stress caused a luteinizing hormone surge to be missing during the follicular phase of ovulation in dairy heifers (Stoebel and Moberg, 1982). Induction of lymphopenia caused luteal dysfunction in cattle (Alila and Hansel, 1984). Prolonged stress affects estrous cycles and prolactin secretion in sheep (Przekop et al., 1984).

Likewise, early pregnancy loss and miscarriage of women and poor quality sperm in men were associated with exposure to magnetic fields (Juutilainen et al., 1987; Li et al., 2002, 2010). Chromosomal abnormalities were in lymphocytes of humans exposed to power frequencies (Nordenson et al., 1984). Genetic defects occurred in offspring of power frequency workers (Nordstrom et al., 1983).

Electrical charge and EMF have been shown to proliferate and exacerbate neuroendocrine stress and cortical hormones in blood of cows (Gorewit et al., 1984a, 1984b), in sheep (Przekop et al., 1984), and in humans (Buchner and Eger, 2011; Eskander et al., 2011).

Decreased fibrinogen in blood of cows after three weeks exposure to ground currents was a significant discovery in a Minnesota farm herd (Hartsell et al., 1994). The "low fibrinogen" corresponds to reports of DNA SSB (single-strand breaks) and DNA DSB (double strand breaks) in human fibroblast cells of persons exposed to EMF, using the comet assay for DNA (Ivancsits et al., 2002, 2003). Nonthermal DNA breakage by mobile phone radiation (1800 MHz) in human fibroblast cells and in transformed GFSH-R17 rat granulosa cells *in vitro* indicates serious deleterious effects of RF-MF radiation (Diem et al., 2005).

"The International Agency for Research on Cancer (IARC) has classified ELF EMF as 'possibly carcinogenic,' a classification which necessarily implies that the epidemiological link (e.g., EMF and leukemia) may be causal and that directly or indirectly, weak ELF magnetic fields may promote DNA damage; that is, they are genotoxic" (Crumpton

and Collins, 2004). Report of DNA damage by exposure to low-level EMF corresponds to the blood chemistry reports from cows (Hartsell et al., 1994). In addition, Hartsell et al reported increased lymphocyte count, decrease of white blood cells, decrease in segmented neutrophils, decrease in monocyte count, and increased SCC (somatic cell counts) in milk after cows were exposed to ground current for 17 days.

A relationship of childhood leukemia to 3rd, 5th, and 7th harmonic (180–420 Hz) current in the living environment of children was reported (Kaune et al., 2002; Wertheimer & Leeper, 1979, 1982). Also, childhood leukemia was 4.3 times higher among children whose bedrooms registered 4 mG, (0.4 μ T-microTesla) or higher, the threshold breakpoint chosen, compared to those with 1.0 mG (0.1 μ T) or less in their bedrooms in Japan (Kabuto et al., 2006).

Maisch (2010, 2012) has explained the Procrustean Approach used by standards-setting committees and has described irrefutable experiences of customers suffering from excessive exposure to electromagnetic fields, including radiation through the wall from Smart Meters in Victoria, Australia. Michigan's Public Service Commission is involved in two smart meter cases (MPSC E-Docket Case # U-16129, 2011, MPSC E-Docket Case # U-17000, 2012).

Since EMF interferes with the autonomic nervous system, control of the neuro-endocrine system which controls essentially all functions of the body toward homeostasis, logically a long list of chronic symptoms are possible, and not necessarily the same in every person, but largely dependent on the individual DNA tolerance or range for the function or dysfunction of a particular organ, tissue, or cell (Berne et al., 1998).

Rea et al. (1991) tested over 100 patients who believed they were sensitive to electrical exposure by challenging them to respond to 2900 nT at the floor, 350 nT at the level of the chair seat, of frequencies ranging from 0.1 Hz to 5 kHz. He found that 16% of the patients responded to 100 percent of the test signals which were repeated randomly 3 times.

Many signs and symptoms of such human common complaints as chronic fatigue syndrome, fibromyalgia, and myofascial pain syndrome may be caused by toxicities such as electrohypersensitivity (Genuis and Lipp, 2011). Electrical exposure often proliferates and exacerbates multiple chemical sensitivities (Scarfi, 2008).

The Electropathic Stress Syndrome is a manifestation of the General Adaptation Syndrome developed by Dr. Hans Selye, M.D. In every aspect of stress studied the uniform systems were (1) enlargement of the adrenal cortex with histological signs of hyperactivity, (2) thymic and lymphatic involution with changes in the blood picture, and (3) gastrointestinal ulcers, usually accompanied by other manifestations of shock (Selye, 1950, 1951; Turner, 1955). Selye and colleagues at the University of Montreal, Quebec, Canada, published some 1500 reports and 27 books describing a lifetime of research defining the effects of stress on animals and man.

EMF proliferates and exacerbates: allergies, asthma, Alzheimer's disease, brain tumors, strokes, CNS cancer, leukemia, breast, ovarian, prostate and testicular cancer; heart arrhythmia-atrial fibrillation. EMF interrupts communication between cells, enzyme action, ATP energy transfer, and neuroendocrine control of the autonomic nervous system, homeostasis; interrupts immune defense, reproduction, neuroendocrine response of adrenals, thyroids, gonads, and other glands as noted above and in the references (Genuis and Lipp, 2011; Johansson, 2006, 2007; Havas, 2006; Havas and Olstad, 2008; Rea et al., 1991; Marino and Ray, 1986; Cherry, 2001; Taylor, 2009; Hillman, 2009a, 2009b; Milham, 2010; Sage and Carpenter, 2012; Li et al., 2011).

5. Conclusions

Dairy cows were sensitive to earth currents associated with transients recorded in neutral-to-ground circuit outlets, from the floor in milking stalls, and in barn yards of twelve farms studied. Ground voltage as low as 10 mV p-p adversely affected milk production. Step

potential voltages recorded by oscilloscope from metal plates in the floor of cow-stalls and in watering tanks were non-sinusoidal distortions of the 60-Hz waveform having frequencies ranging from the 1st through the 42nd harmonic, and up to 30 MHz with numerous impulses in overload, exceeding the capacity of the oscilloscope. The quality of electric power on farms and power lines affecting cattle was inferior to the 60-Hz steady-state sinusoidal current described in "stray voltage" laboratory reports (Appleman and Gustafson, 1985; Lefcourt and Akers, 1982; Stray Voltage Symposium, 1984; USDA, 1991).

Cow's behavior, health, and milk production were negatively responsive to harmonic distortions of step-potential voltage, suggesting that utility compliance with IEEE standards on dairy farms needs to be addressed. Measures of step potential were recorded by battery-powered oscilloscope while the primary power supply was completely disconnected from each farm. During this period there were no detectable changes in spikes on waveforms indicating the inferior power was from off-farm sources transferred on the neutral wire, uninterrupted in a grounded-Wye distribution system.

Power quality varied greatly from farm to farm and day to day. Milk production responses to changes in power quality varied inversely with the number of transient events recorded with event recorders, oscilloscope, and power quality meters. Harmonics often gave better estimates of electrical effects on milk production than voltage *per se*.

Peak-to-peak values were correlated with changes in milk production which permitted measuring the partial effects of independent variables of electrical currents on milk production using multiple regression analysis in the present research.

Use of a 500-Ohm resistor in the volt meter test circuit, for power quality, effectively eliminates from consideration the electrical measures that were found to be harmful in this study and may give misleading or unreliable information to investigators and herd owners. Studies of the effects of various electrical frequencies and harmonics on animals and humans and the physiological processes affecting behavior, health, reproduction and productivity deserve further attention.

Because power company employees and public service commissions are unable to find transients and harmonics in stray voltage, it would be advisable for all of them as well as professors of electricity to read Barry Kennedy's Power Quality Primer (Kennedy, 2000).

IEEE-SA, Standards Association Marketing Manager Shuang Yu announced, 25 April 2011, that the IEEE Standards Board approved new projects that will limit the injection of harmonic frequencies into the public electric transmission system. The release said further: "Harmonic pollution is a growing problem caused by the widespread use of power supplies and other non-linear loads. It can result in power loss and equipment damage and it may also be related to environmental safety issues. Both standards will address harmonic injection in 60-Hz and 120-V/240-V systems such as those in use in the United States, Canada, and other regions of the world. Both standards will also use the IEC SC77A and IEC 61000-3-12 standards as seed documents." The IEEE Standards Association should include harmonic current effects on human and animal health as well as effects on electrical equipment.

Acknowledgments

Special appreciation is expressed to Jeff Goeke-Smith, Network Planner and Security Engineer, Michigan State University, who assisted his father, Charles Goeke, and Dave Stetzer in recording and analyzing data, and to Dr. Edward Rothwell and Dr. Kun Mu Chen, Professors and Electrical Engineers, Michigan State University, for their helpful suggestions and for confirming electrical measurements in East Lansing, MI, homes. Also, Mary Hillman, for preparing and editing the manuscript, and all the farm families who shared their technical, financial, and personal information for the benefit of neighbors and advancement of public knowledge.

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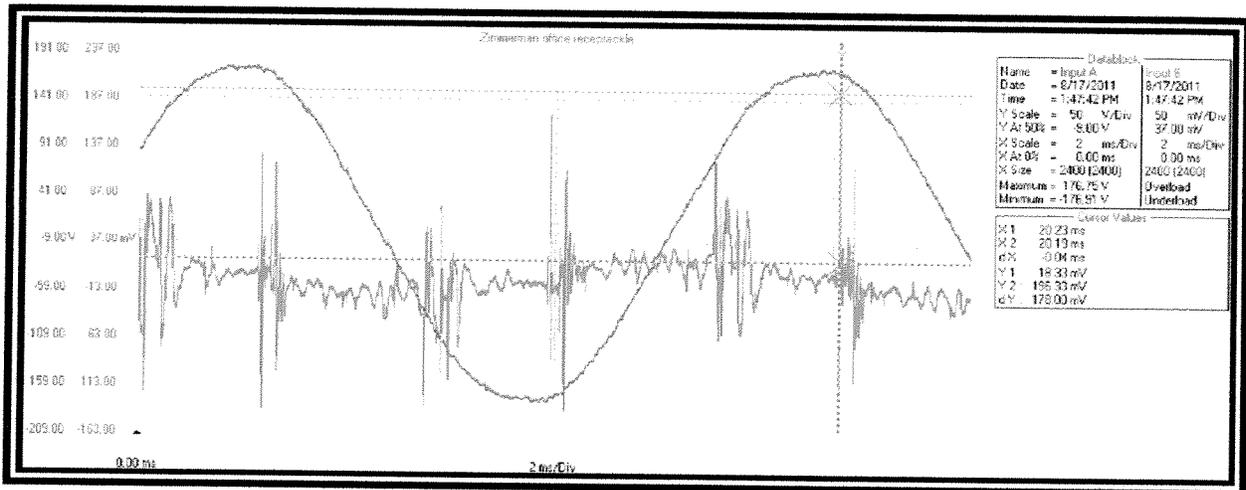
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Exhibit 2

**MPSC & Power Companies Do Not Find
All of the Voltage when Making Measurements!
They Measure only Vp (Voltage from the Half Cycle)
Not Voltage p-p (Voltage from the Full Cycle)**



When viewing this waveform, if MPSC and Power Companies use instruments that measure only half of the waveform, they will miss more than half of the voltage and will not be able to help the person for whom they are measuring!

This faulty practice of using instruments that measure only half of the waveform must be stopped!!

**Proof provided is Exhibit # R_(DJR 26), Case No. U-11684,
by Witness Douglas J. Reinemann
Paper No. 943602
An ASAE Meeting Presentation
First Three Pages follow**

This type of measurement was used on farms and many farmers were forced into bankruptcy or into selling out!

It is happening now with Smart Meters! They don't find it because they use faulty instruments!

Paper No. 943602
An ASAE Meeting Presentation

CHARACTERISTICS OF COW CONTACT VOLTAGE TRANSIENTS

by

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Written for presentation at the
1994 International Winter Meeting
sponsored by

THE AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS
Atlanta, Georgia
December 13 - 16, 1994

Summary:

The Wisconsin Stray Voltage Analysis Team has been collecting data on transient cow contact voltages on Wisconsin dairies since 1989. This paper presents the characteristics of the main categories of transient voltages commonly occurring in dairy barns in Wisconsin. The relationship between transients occurring on the primary distribution system neutral, the farm secondary neutral and on cow contact locations will be discussed. Instrumentation and measurement techniques to determine the source of transient voltages will also be discussed.

Keywords: Stray Voltage, Measurement

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CHARACTERISTICS OF COW CONTACT VOLTAGE TRANSIENTS

INTRODUCTION

The Public Service Commission of Wisconsin (PSCW) has been doing stray voltage investigations since the early 1980s. In 1987 the PSCW and the Department of Agriculture Trade and Consumer Protection (DATCP) combined resources and conducted a formal investigation of nine farms in Wisconsin in order to report to the Governor and Legislature regarding the extent of stray voltage problems in the state. The "Nine Farm Study" was the basis of legislation that created the Stray Voltage Program at the PSCW. Following enactment of the legislation, the PSCW held statewide public and technical hearings in 1988 that resulted in a formal determination by the Commission known as docket 05-EI-106 (docket 106). Docket 106 established the "level of concern," test procedures and the responsibilities of the state's electric power suppliers in dealing with stray voltage.

Until that time, routine investigations were done primarily by the electric power suppliers with the inevitable concern by some members of the farm community that the testing by the power suppliers was biased. The PSCW with its regulatory authority over the state public utilities was able to establish statewide guidelines for testing and mitigation, resulting in more uniform stray voltage service. The electric Cooperatives, while not under the jurisdiction of the PSCW, agreed to voluntarily comply with docket 106. As part of docket 106, the PSCW established the Stray Voltage Analysis Team (SVAT). One of the SVAT's primary roles was to help farmers who were not satisfied with their power suppliers assessment of their stray voltage concerns. The SVAT was to measure the electrical parameters on the farm and on the distribution system to determine whether or not assessments made by utility investigators were reasonable. An important function of the SVAT included an assessment of non-electric factors that could produce symptoms similar to those of stray voltage.

The SVAT consists of a distribution engineer, an electrical inspector and a veterinarian. The engineer is responsible for reviewing the off-farm distribution system and its impact on stray voltage. The electrical inspector is responsible for reviewing on-farm wiring. The veterinarian is an important member of the team with the ability to assess farm management factors and their impact on animal performance. The SVAT attempts to define both electrical and non-electrical factors that may be impacting the farm operation. The SVAT believes that only a complete assessment of the farm environment and operation can provide the farmer with the tools to improve his operation.

Docket 106 focuses on steady state 60 hertz AC voltages. The "level of concern" established in docket 106 is defined as 1.0 milliamperes, 60 hertz steady state Root Mean Square (RMS) current in the cow contact area (0.5 volts across a 500 ohm resistor). Stray voltage is a steady state AC RMS voltage which can be measured between two points which livestock may contact simultaneously. Steady state value is defined as: "The value of a current or voltage after all transients have decayed to a negligible value". Transients are defined as "changes in the steady state current or voltage caused by faults, operation of protective devices, switching, reclosing,

tap changing, motor starts or stops, motor stalls or other phenomena that are temporary in nature”.

The Public Service Commission of Wisconsin (PSCW) has initiated a new docket, 05-EI-108, which is investigating transient voltages, as well as other electrical phenomenon, in an effort to resolve concerns about perceived electrical problems that exist after stray voltage has been reduced to below the “level of concern”. In response to concerns that voltage spikes, transients, or other power quality problems were affecting livestock, the SVAT acquired a Dranetz 658 Disturbance Analyzer as a measuring device to determine if power quality problems associated with power supplier distribution systems were impacting voltages in cow contact areas. Since 1992, the SVAT has used its monitoring equipment to measure both steady state and transient voltages in the cow contact. This paper presents a review of the types of transients that have observed during SVAT investigations.

MEASUREMENT INSTRUMENTS AND TECHNIQUES

The measurement circuits used during a SVAT investigation always include the following:

- V_p** A voltage between the grounded primary neutral at the transformer and a reference rod approximately 150' away. This voltage is measured open circuit.
- V_s** A voltage between the secondary neutral bus at the barn main service and a reference rod approximately 150' away. This voltage is measured open circuit.
- V_{cc}** A voltage at a cow contact point, typically from a water line, stanchion, bunk feeder, or waterer to a copper plate on the floor. This voltage is measured with a 500 ohm shunt resistor.

The equipment listed below monitors and records these voltages. The transients discussed in the paper pertain to these monitoring points. For the purposes of this discussion a transient will be described with the following parameters:

- peak voltage** The maximum voltage of the half cycle having the greatest excursion from zero, either positive or negative (zero to peak),
- phase duration** The time from one zero crossing to the next of one half cycle, and
- event duration** The time during which the voltage is elevated above background levels. The event may contain multiple cycles and will, in general be greater than the phase duration.

The phase duration has been shown to be a critical parameter determining animal sensitivity to peak voltage (Reinemann et al, 1995).

Ephedil 3

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Effects of Extraneous Electricity on Dairy Cattle, Other Animals, and Humans - A Guide for Dairymen, Veterinarians, and Investigators of Stray Voltage --Manuscript Draft--

Manuscript Number: SciTech-14-605
Full Title: Effects of Extraneous Electricity on Dairy Cattle, Other Animals, and Humans - A Guide for Dairymen, Veterinarians, and Investigators of Stray Voltage
Short Title:
Article Type: Research Article
Section/Category: Veterinary Science & Medical Diagnosis
Keywords: Extraneous electricity, EMF, dairy cattle and human health
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UNITED STATES
Corresponding Author Secondary Information:
Corresponding Author's Institution:
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Order of Authors: Donald Hillman
Order of Authors Secondary Information:
Manuscript Region of Origin: USA

Abstract: This study resulted from requests by four farm families in Sanilac County, MI, who were having extraneous electricity problems which the power company could not find. Their animals and they themselves were having health problems. All four filed complaints with the Sanilac County Health Department. Simultaneously, and again not found by the power company, the author responded to families suffering from electromagnetic fields (EMF) emitted from Smart Meters and from Wi-Fi and iPads in schools and found dangerous levels of high-frequency electricity. Symptoms reported agreed with those from the literature review in an earlier study I co-authored. Symptoms included: drowsiness, malaise and headache, mood swings, eye problems, poor concentration, convulsions, fainting, vertigo and tinnitus, numbness and tingling, nausea and flatulence, noise sensitivity, and alteration in appetite. Heart problems, thyroid cancers, other cancers, and glaucoma were also being treated for some who were exposed. In the cases studied for this article, Graham-Stetzer Meters and Filters were used to help remedy the problems discovered. Milk production increased and a child's health improved following insertion of G-S Filters. An earlier peer-reviewed study by this author with associates found animal behavior and milk production were affected by electrical shocks below adopted standards after investigating 12 dairy farms in Wisconsin, Michigan, and Minnesota. Data from 1705 cows and 939 data points revealed significant negative effects of milk/cow/day from event-recorder measurements for eight independent electrical variables. Public Utility Commissions, commissioned to make sure electricity distribution is safe, use 500-Ohm resistors in test circuits, underestimating effects of non-sinusoidal, high-frequency voltage/current common on power lines, and the equipment they use measures only peak voltage, not peak-to-peak. These studies prove that utilities need to update their equipment to discover and remove electro-magnetic fields.

Suggested Reviewers:

Opposed Reviewers:

**Effects of Extraneous Electricity on
Dairy Cattle, Other Animals, and Humans –
A Guide for Dairymen, Veterinarians, and Investigators of Stray Voltage**
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ABSTRACT

This study resulted from requests by four farm families in Sanilac County, MI, who were having extraneous electricity problems which the power company could not find. Their animals and they themselves were having health problems. All four filed complaints with the Sanilac County Health Department. Simultaneously, and again not found by the power company, the author responded to families suffering from electromagnetic fields (EMF) emitted from Smart Meters and from Wi-Fi and iPads in schools and found dangerous levels of high-frequency electricity. Symptoms reported agreed with those from the literature review in an earlier study I co-authored. Symptoms included: drowsiness, malaise and headache, mood swings, eye problems, poor concentration, convulsions, fainting, vertigo and tinnitus, numbness and tingling, nausea and flatulence, noise sensitivity, and alteration in appetite. Heart problems, thyroid cancers, other cancers, and glaucoma were also being treated for some who were exposed. In the cases studied for this article, Graham-Stetzer Meters and Filters were used to help remedy the problems discovered. Milk production increased and a child's health improved following insertion of G-S Filters. An earlier peer-reviewed study by this author with associates found animal behavior and milk production were affected by electrical shocks below adopted standards after investigating 12 dairy farms in Wisconsin, Michigan, and Minnesota. Data from 1705 cows and 939 data points revealed significant negative effects of milk/cow/day from event-recorder measurements for eight independent electrical variables. Public Utility Commissions, commissioned to make sure electricity distribution is safe, use 500-Ohm resistors in test circuits, underestimating effects of non-sinusoidal, high-frequency voltage/current common on power lines, and the equipment they use measures only peak voltage, not peak-to-peak. These studies prove that utilities need to update their equipment to discover and remove electro-magnetic fields.

Keywords: Extraneous electricity, EMF, dairy cattle and human health

1. Introduction

In January 2013, Elsevier published an article in their *Science of the Total Environment* journal which gives an extended review of the effects of electric power quality on dairy cattle [1]. The author and his associates found that animal behavior and milk production were affected by electrical shocks below adopted standards after investigating 12 dairy farms in Wisconsin, Michigan, and Minnesota. Data from 1705 cows and 939 data points revealed negative effects of milk/cow/day from event recorder measurements were significant for eight independent electrical variables. Milk decreased as number of 3rd, 5th, 7th, 21st, 28th, and 42nd harmonics and the sum of triplen harmonics (3rd, 9th, 15th, 21st, 27th, 33rd, and 39th) increased [1-2]. Electricity with these harmonics is frequently called "dirty electricity."

In 2002, Barry Kennedy published a book entitled **Power Quality Primer** which gives a clear and scholarly understanding of power quality and changes that occur under various conditions involving extraneous electricity [3]. Mr. Kennedy was a power line engineer who

recognized that when power companies were deregulated power quality problems could occur. His book explains what can happen if power quality is not considered. Kennedy states [author bolding is for emphasis]:

“ . . . By their very nature power quality problems involve some distortion of the sine wave. Power quality disturbances like harmonics, sags, or swells in the voltage and current, distort the sine wave. The correct measurement tool for a power quality problem must accurately measure the characteristics of a distorted sine wave. Consequently, . . . a multimeter user who wants to solve power quality problems must first avoid an average-responding meter and select instead a true rms meter.”

“As their name implies, **true rms multimeters measure the “true” rms of a distorted sine wave.** . . . They either use the heating effect of the voltage across a resistor or sample the signal’s waveform **with a microprocessor, calculate the rms value, and display the true rms value. . .**”

“Average-responding and **peak-value multimeters** do not measure the true rms value of a distorted sine wave. They sample values of the alternating current over a cycle, determine the average value of the sine wave, and convert it to effective amperes or rms amperes. They convert alternating current to rms amperes by multiplying the average value of the waveform by 1.414 ($\sqrt{2}$) if they use the averaging method, or 0.707 if they use the peak method. Average-responding rms meters measure distorted waveforms with readings that are **25 to 50 percent below the actual rms values** . . . the average rms method results in inaccurate measurements of a distorted waveform because it measures the waveform over time and misses distorted waveform peaks” [3].

In 1994, the Wisconsin Stray Voltage Analysis Team (SVAT) made the choice that a SVAT investigation would include only V_p (**not V_{p-p}**) readings [4]. This decision was adopted by the WI Public Service Commission as well as by Minnesota and Michigan’s Public Service Commissions. All three states’ utility commissions measure with instruments such as the SVM-10 and Waverider, adjusted to read only peak (not peak to peak) values, thus missing half of the distorted waveform, giving a false reading [1]. Since the Midwest USA utilities’ voltmeters do not read peak-peak values, they use “average peak” readings, missing the distorted waveforms, and report 25 to 50% below True RMS readings [3].

Quality of power has often been described as “clean” or “dirty.” Clean power refers to power that has sinusoidal voltage and current without any distortion and operates at the designed magnitude and frequency.

Cows Were Sensitive to Peak-to-Peak Voltage Not Average Peak Values in experiments to test how much current would cause cows to remove their head from a water bowl and to determine the effect of frequency on Holstein sensitivity [5]. Cows were less sensitive, i.e., would tolerate more current as frequency increased from 60 Hz to 600, 6,000 and 30,000 Hz. Tolerable current increased from 4.95 mA rms to 6.77, 34.37, and to 132.5 mA rms respectively. The finding is consistent with previous observations that cows did not react to high frequency current when current flow exceeded 10 mA. This also concurs with our observation that cows did not perceive the high frequency currents that caused them to become ill and refuse to drink adequate amounts of water that contained 35 to 200 mA spikes of 0.112 Volt but 1.135 GHz

frequency of microwave current in the drinking-water, measured with oscilloscope, and also a clamp on ammeter at the Tensen Farm as shown below in Figures 1 and 2 [6].

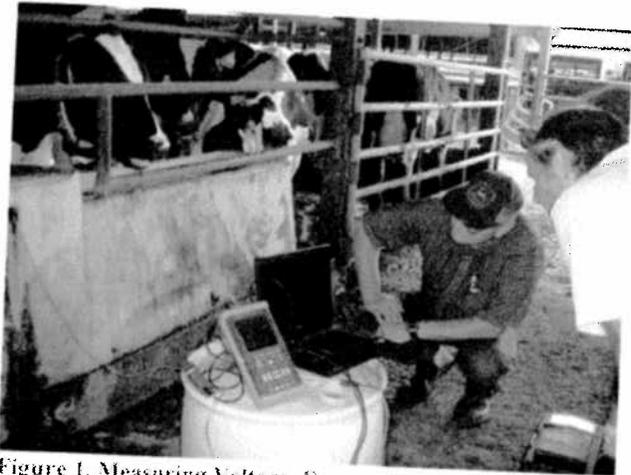


Figure 1. Measuring Voltage, Frequency, and Current with an Oscilloscope in the Cows' Watering Tank and Recording on Computer at Tensen's Farm (7/22/2008).

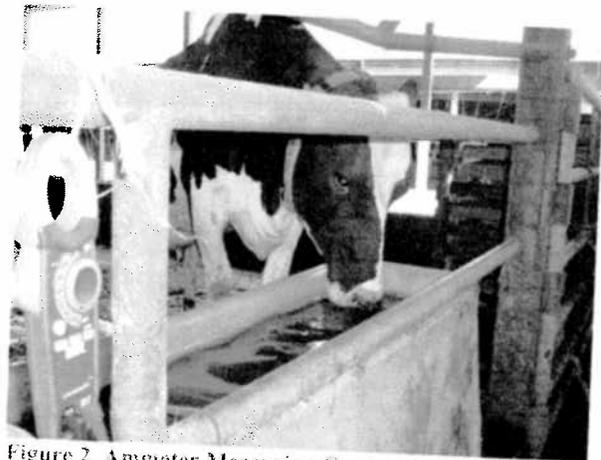


Figure 2. Ammeter Measuring Current in Water at Tensen's Farm Disclosed 30-50 mA (7/22/2008).

Multimeters that measure **peak-to-peak voltage or current** acquire data that correlate well with changes in milk production. But PSC rules that require 1 minute **average peak voltage** rms value as an indication of steady-state current underestimate voltage and current exposure of the cattle and is therefore misleading regarding the effect of such current on animal behavior, health, and production.

2. Farm Investigations

2.1. Extraneous Electricity (EMF) at John and Carol Szymanski Farm

From 2011 to 2013, I have been checking on the extraneous electricity on the John and Carol Szymanski farm near Argyle, MI, at his request, and have found that current supplied by Thumb Electric Cooperative, Inc, Ubly, MI, is regularly distorted and supplied "dirty electricity" to the farm and to the home.

During my first call from Mr. Szymanski, he reported that milk per cow per day had decreased from 71.7 to 52.4 pounds per day at 150-day per DHIA test-day average, and cow numbers had decreased from 220 cows to 177 cows, with 67% of cows producing less than 40 pounds per day.

My son, Louis Hillman, assisted me on our visit to the farm on June 13, 2011, and using an oscilloscope we found 30 milliAmperes (mA) of electricity in the water tank. The power company had installed a Ronk Blocker, but it failed to prevent the voltage surge from appearing on the Szymanski neutral wire when the neighbor started his silo unloader and other equipment. The magnetic field, 20-25 milliGauss (mG), under the lines near the house, was unsafe per Occupational Safety and Health Administration (OSHA) safe recommendations.

OSHA considers exposure to V/500 Ohms greater than 1.0 mA as "Hazardous Current" and requires OSHA employees to be properly protected from electrical exposure [7]. Enforcement of the Electric Power Generation, Transmission, and Distribution Standard (above) states:

"Hazardous energy means a voltage at which there is sufficient energy to cause injury. If no precautions are taken to protect employees from hazards associated with involuntary reactions from shock, a hazard is presumed to exist if the induced voltage is sufficient to pass a current of 1 milliAmpere (mA) through a 500-Ohm resistor. The 500-Ohm represents the resistance of an employee."

Utility employees working on Right-of-Way acquired by Thumb Electric Cooperative (TEC) as in front of the John Szymanski property where 20-25 mG, equivalent to 1.6 -2.0 Amperes of electricity per square meter at head height are certainly in a Hazardous Environment requiring shielded clothing. Therefore, the front yard, or anywhere near the TEC lines is hazardous for children and family members to enjoy their property. The Szymanskis and three neighbors (Janowiaks, Zimmermans, and Nichols) filed health complaints with the Sanilac County Health Department, Sandusky, MI, because each family had health problems. I had made measurements and reports to all the families except the Janowiaks who live across the road from the Szymanskis.

2.2 Dave Stetzer, Electrician from Blair, WI, Visits the Szymanski Farm

At my request, while I was hospitalized in October 2012, Dave Stetzer and two assistants visited the Szymanski farm. His measurements correlated very well with ones we had taken previously and Figure 3 shows 15.6 mV between the cow watering tank and a 16 sq. inch metal plate 5 ft back from the tank [8]. The measurements fluctuate from minute to minute.

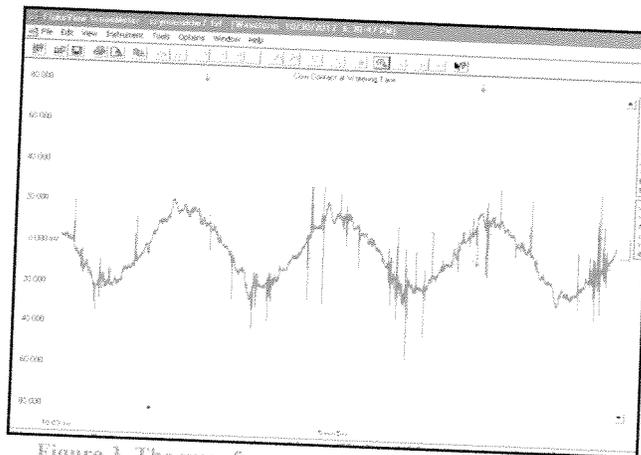


Figure 3. The waveform was measured with a Fluke 199 Scope Meter between the cow watering tank and a 16 sq. in. Metal Plate 5 ft. back on the John Szymanski Farm near Argyle, MI, USA (10/30/2012).

2.3. 2013 Visit to Again Measure the EMF at Szymanski Farm

My son and I made 6 visits to the Szymanski farm from 2011 to 2013. Each time we found very high levels of "dirty electricity." On July 31, 2013, we arrived at the farm at about 8:30 a.m. while the crew was still milking and made measurements and attempted to mitigate the extraneous electricity with filters.

We used a Fluke 79 III Voltmeter and recorded 100-150 mV (milliVolts) from the medal side of the building to the milk tank. We had earlier used a G-S Meter (Graham-Stetzer Meter) at the 60-Hz outlet in the milk house and measured 996-1021 G-S units (below 30 G-S units is considered safe). Using a Craftsman Clamp-on Ammeter we measured the Utility-Down Ground at the pole and found 80-90 mA and a second time 30-40 mA. The copper-braid ground was 1.37-1.38 A. At the cows' drinking water tank we measured 10 mA. Under the wires next to the road, at head height we found 10-15 mG using the AlphaLab Trifield Meter. All of these measurements were made while the milkers' were operating. We noted considerable variation in the electrical readings.

We measured the Secondary N-G from the Electrical Distribution Box at the milk house with a Fluke 225c Oscilloscope and recorded 0.1 V \pm -2.5 V spikes; Frequency equaled 40 Megahertz at Secondary N-G Distribution Panel, the milker was operating at 9:48 a.m. We took a second reading at this location at 9:56 a.m. with the Oscilloscope. The Voltage was -0.2 V + 3.8 V spikes. Frequency equaled 20 Megahertz using the same Fluke 225c Oscilloscope.

We then took measurements on the floor of the milking parlor at 11:28 a.m. The Voltage was -0.1 V on the floor of the milking parlor and spikes exceeded 6 V when the vacuum pump was turned on 3 times. Frequencies were abnormal as well.

2.4. Experiment to Remove EMF at Szymanski Farm – July 31, 2013

We used the G-S Meter to measure the G-S Units in the Szymanski House. We inserted Graham-Stetzer (G-S) Filters, also called "Stetzerizer Filters" as necessary to reduce Frequency to less than 30 G-S units in each of the 120-V outlets in the House that were "hot spots" (exceeded 30 G-S units). We did the same at all the "hot spots" which were located in the living room (325 G-S units) and then 92-95 G-S units at 4 other locations including the upstairs and some outlets in the barn.

After inserting the filters, we again used the Fluke Oscilloscope and found ZERO Volts (0.0 V), on the cows' drinking water tank and Frequency had returned to 60 Hz after installing the G-S Filters at identified hot spots in the house and barn.

Experience had taught us that several months would likely be necessary before the cows' milk would return to normal. Today, June 6, 2014, each cow is producing 82 lbs, if dry cows are removed. Thirty cows are producing 80 to 126 lbs. The reading on the G-S meter is 8 G-S units.

2.5. Black Light Fluorescence in Cows' Drinking Water

Figure 4 shows a Black Light Fluorescence in the cows' drinking water at the Szymanski farm. The photo was taken when a Phillips 75-Watt, 120-V Blacklight A19 was shone into the water tank. While we attach no new significance to the observation, the fluorescence seen in the water was noted in a report by Emilio Del Giudice and Livio Giuliani in Coherence in water and the kT problem in living matter, Eur. J. Oncol. - Library Vol. 5, Bologna, Italy, 2010.

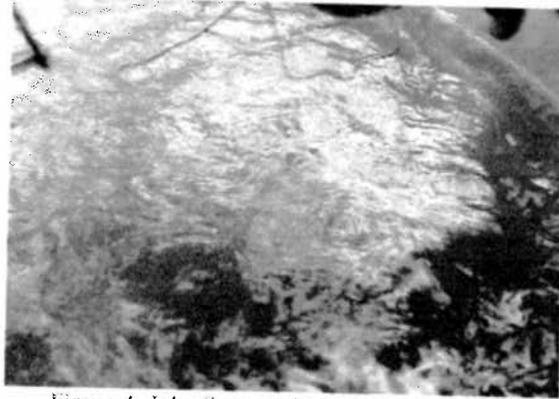


Figure 4. John Szymanski Dairy Water Tank.
A photocopy of fluorescence in water from Blacklight.

2.6. Livestock Trucker Observes a Neighbor's Sickly Cattle

A livestock trucker and dairy farmer (April 22, 2014) noticed the poor condition of cattle at the farm of Sheldon Zimmerman at 3259 W. Deckerville Road, Sanilac County, MI. With Zimmerman's permission, he engaged Jeffrey Janowiak, an electrician who lives near Argyle, to have a look at the Electrical System. He also engaged Robert Cuny to assist and take pictures of the procedures. Jeff found that Detroit Edison Co. operates the system, and, using an Amp Meter, he found that 0.9 amperes (900 milliamperes) travel from Neutral to Ground (Figure 5), and 26.91 Amperes were feeding the barn (Figure 6) and in the CT Cabinet (Figure 7).



Figure 5. Amp Meter displaying 0.9 Amperes travelling from Neutral to Ground on the S. Zimmerman farm.



Figure 6. Amp Meter displays 26.91 Amperes feeding the barn.

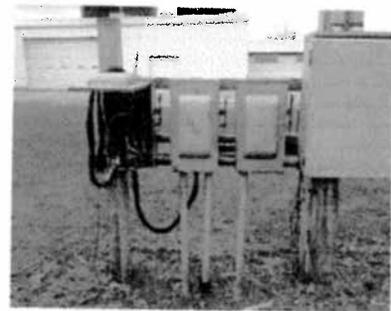


Figure 7. CT Cabinet.

Jeff and Bob then used a Graham-Stetzer Microsurge Meter to measure current and inserted Graham-Stetzer filters at locations where readings were high throughout the barn.

Figure 8 shows 323 Microsurge units at a panel in the milk barn. Figure 9 is a G-S reading of 264 left of the refrigerator. Figure 10 is a G-S reading of 1269 at the milk tank, Figure 11 shows a 1569 G-S reading at the milk tank.

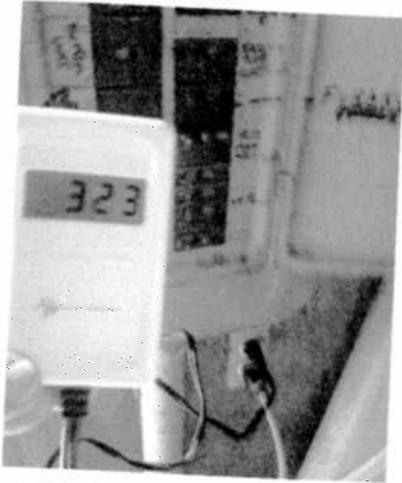


Figure 8. Graham-Stetzer Meter displays 323 Microsurge Units at a panel in the milk barn at S. Zimmerman farm.



Figure 9. G-S reading of 264 left of refrigerator at S. Zimmerman farm.

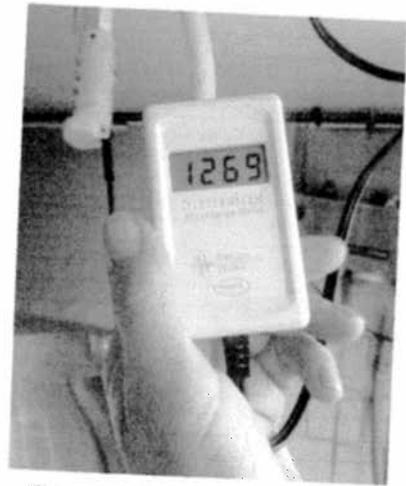


Figure 10. G-S reading of 1269 at the milk tank on the S. Zimmerman farm.

Figure 12 shows a G-S reading of 274 at the rear of the milking floor.



Figure 11. G-S reading of 1569 at the milk tank on the S. Zimmerman farm.

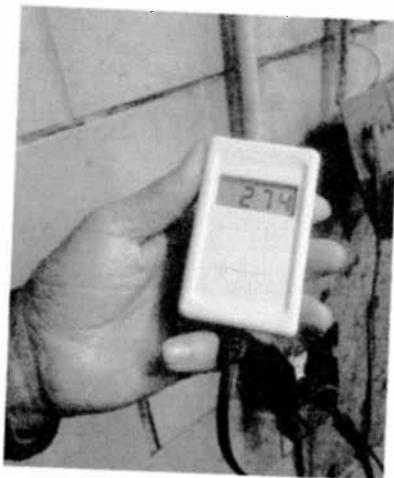


Figure 12. G-S reading of 274 at the rear of the milking floor on S. Zimmerman farm.

Figure 13 shows a reading of 1926 G-S Units taken in the Barn by a panel near water tanks.



Figure 13. G-S reading of 1926 in the S. Zimmerman barn near water tanks.



Figure 14. G-S reading of 1682 in the same location as Figure 13.

Figure 15 displays the G-S reading in the barn of 1824 taken by the same panel near water tanks. Figure 15 below shows a G-S reading in the "mixing room" at 1824 units.



Figure 15. G-S reading 1824 in S. Zimmerman's "mixing room."

Figure 16 pictures a G-S reading of 1723 in the feed room on the south wall. Figure 17 is a G-S reading of 1639 G-S Units measured in the feed room on the north wall. Figure 18 displays 1715 G-S Units measured in the feed room on the North wall, and Figure 19 shows 1738 G-S reading in the feed room by a panel.



Figure 16. G-S reading of 1723 in S. Zimmerman's feed room on the south wall.



Figure 17. G-S reading of 1639 in S. Zimmerman's feed room on the north wall.



Figure 18. G-S reading of 1715 at the same location as Figure 17.

Figure 20 shows a Graham-Stetzer plug-in with two filters inserted and a Graham-Stetzer Microsurge Meter plugged into the wall showing 50 microsurge units.



Figure 19. G-S reading of 1738 in S. Zimmerman's feed room near a panel.



Figure 20. A Graham-Stetzer Plug In with a G-S Meter reading 50 microsurge units with 2 G-S Filters inserted to reduce the intensity of the microsurges in the S. Zimmerman barn.

Dr. Martin A. Graham, Professor Emeritus, University of California, Berkeley, CA, and David Stetzer, Electrician at Blair, Wisconsin, developed the Graham-Stetzer process for discovering and mitigating "dirty electricity." They have used the process to remove high-frequency current from farms and homes to prevent health effects caused from high-frequency electricity. Robert Cuny, from Imlay City, supplied the Graham-Stetzer equipment used on the Zimmerman farm. Other farmers in the area, including John Szymanski who is served by Thumb Electric, have experienced the same problem with dairy herds and human health.

3. Discussion

The stray voltage problem is the result of utilities in alliance with public service commissions intentionally dumping return currents into the earth in violation of PUC rules, using instruments that measure only peak voltage, and declaring there is no stray voltage [1].

3.1. Finding EMF Generated from Smart Meters

Our finding of stray voltage on farms is consistent with our finding of dangerous EMF on a home in Ferndale, MI. In March 2012, Verne and Jackie Lamphear, stopped in to discuss a grandchild's health problem. Verne had had 2 stray voltage cases solved and had suffered many health problems resulting from EMF among which was thyroid cancer. Inasmuch as I had helped him with his farm problem he stopped at my home to question me about the possibility of there being stray voltage in the child's home. They mentioned that the child's behavior when visiting their home in Haslett, MI, was very good but when at home her behavior became erratic. I told them about our discovery of high levels of EMF in our own home and showed them Graham-Stetzer filters we had installed to make our home environment safe.

Verne then asked if I would visit and measure for EMF in the child's home. Because I was ill, I loaned him my Graham-Stetzer meter and a few Graham-Stetzer filters as well as my Alpha Lab, Inc., Trifield Gauss Meter to check for pollution.

He measured the radio frequency in the child's play room from a 120-V outlet on the inside wall where a Smart Meter had been installed by Detroit Edison Co (DTE). Using the Graham-Stetzer meter he determined that the G-S units fluctuated between 462 and 691. In the child's bedroom next to the playroom, the readings were 660-771 GS units. The child became ill and her thyroid had become totally inactive according to medical authorities at Beaumont Medical Center in Detroit.

Verne installed 7 G-S filters throughout the house reducing the G-S units to less than 30 at all locations in the house in Ferndale, MI. Utilities' claim that "Smart Meter emission is not harmful to humans and animals" is not valid. Photographs of the microsurge readings taken at the child's home before and after the filters were installed follow in Figures 21 and 22.

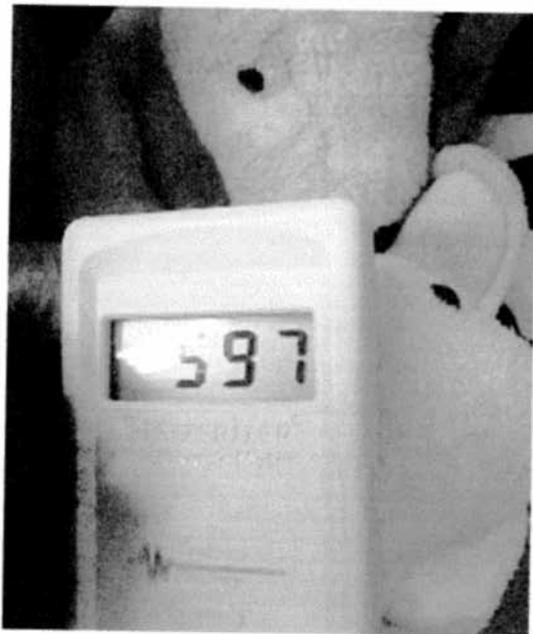


Figure 21. Readings before filters were installed.



Figure 22. Readings after filters were installed.

Verne had also measured the current with the Alpha Lab, Inc. Trifield Gauss Meter at that time, and the reading exceeded 100 mG.

The child, who was suffering from thyroid deficiency, is now receiving thyroid medication and is greatly improved. Verne reported his findings about Smart Meters with the Michigan Public Service Commission, and I used it in my Affidavit in Oakland County Circuit Court's Case File No. 12-126503-CZ [10], which is a Smart Meter case filed by Detroit Edison Company (DTE) vs. Lillian and Dominic Cusumano, still in progress.

Dominic and Lillian Cusumano live in St. Clair Shores, MI. The EMF radiated from a Smart Meter at their home was causing health problems to Lillian, who is sensitive to electricity. After consulting DTE to remove the Smart Meter and waiting several weeks, Dominic removed the Smart Meter himself and replaced it with an Analog Meter. Then DTE filed a complaint in the Circuit Court for the County of Oakland on June 20 as mentioned above.

It is interesting to note that on June 21, 2012, the Oakland County Board of Commissioners approved a resolution that supports the right of every utility customer to be able to opt-out of a "Smart Meter" electric meter without cost or penalty [11].

3-2. Finding EMF from WiFi iPads in Almont, MI, Home and Schools

On September 30, 2013, I received a telephone call from a young mother, Rachel Fitchett, saying that she had four children and was worried because Almont (MI) Middle School and Almont High School had purchased 1,020 new Wi-Fi iPads to replace textbooks in all grades. Her son was exposed to excessive amounts of radiation to his skull via xrays and CAT scans when he was only 5 months old, so an added source of exposure concerned her. She had purchased a new Tri-Field Meter^R and wondered if I could help determine the EMF in the school area. We decided to meet at a home that Rachel had determined was best to produce a small scale replication of a classroom setting. The home was wired for WiFi and had two routers for handling wireless devices. The homemaker at this house had three children; one child with cancer in remission.

The two women had collected 5 iPads compatible with the Schools' wireless devices. They had a cell phone and a smart phone to sample because they knew the student body owns these instruments which add to the cumulative exposure, Figure 23.



Figure 23. Devices measured: 2 Almont School iPads, 3 privately owned iPads, 1 Smart Phone, and 1 Flip-top Cell Phone.

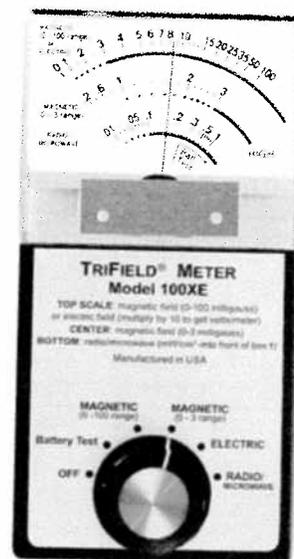


Figure 24. Tri-Field^R Meter.

I began measuring the EMF transmitted by the Wi-Fi iPads with the Tri-Field[®] meter [Figure 24]. The meter registered 0.2-2.0 mG situated in the center of the iPads.

I then measured electricity from the 120-V outlet in the dining room using the Graham-Stetzer Microsurge Meter. It measured 152 microsurges [Figure 25]. Then I measured it again with a Stetzerizer Filter plugged into the same outlet and the reading was 22 microsurges, as shown in Figure 26.



Figure 25. Graham-Stetzer Microsurge Meter.



Figure 26. G-S Microsurge Meter Measurements after Inserting G-S Filter into Electric Outlet.

Then, John Holeton began measuring with his HF 35C Frequency Analyzer. This meter measures in microwatt/m² also known as $\mu\text{W}/\text{m}^2$. He first measured near the iPads and found 2000 microwatts/m² (2000 $\mu\text{W}/\text{m}^2$). This is the equivalent of 2 milliamperes (mA) measured earlier with the Tri-Field [Figure 27].

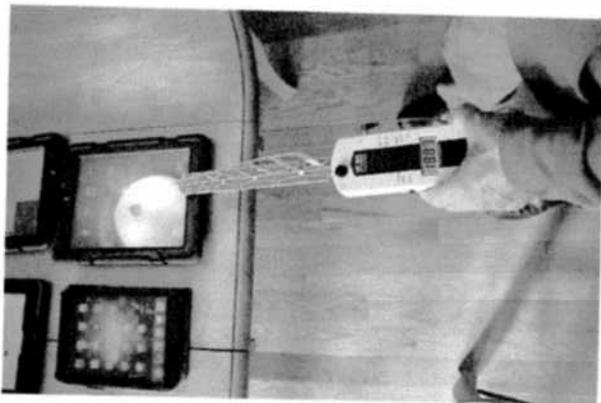


Figure 27. Reading from an Almont School (ACS) Issued iPad while using the WiFi Internet – 1446 $\mu\text{W}/\text{m}^2$. Readings did exceed 2,000.

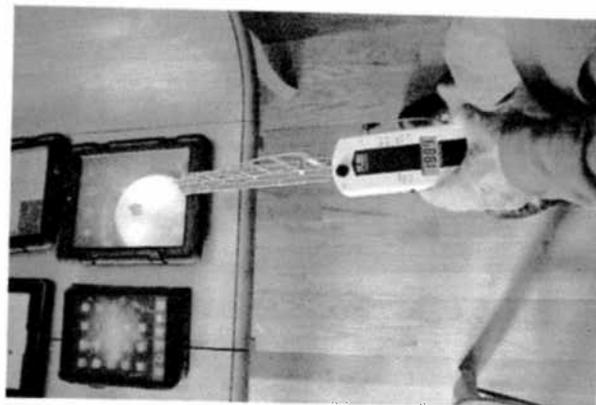
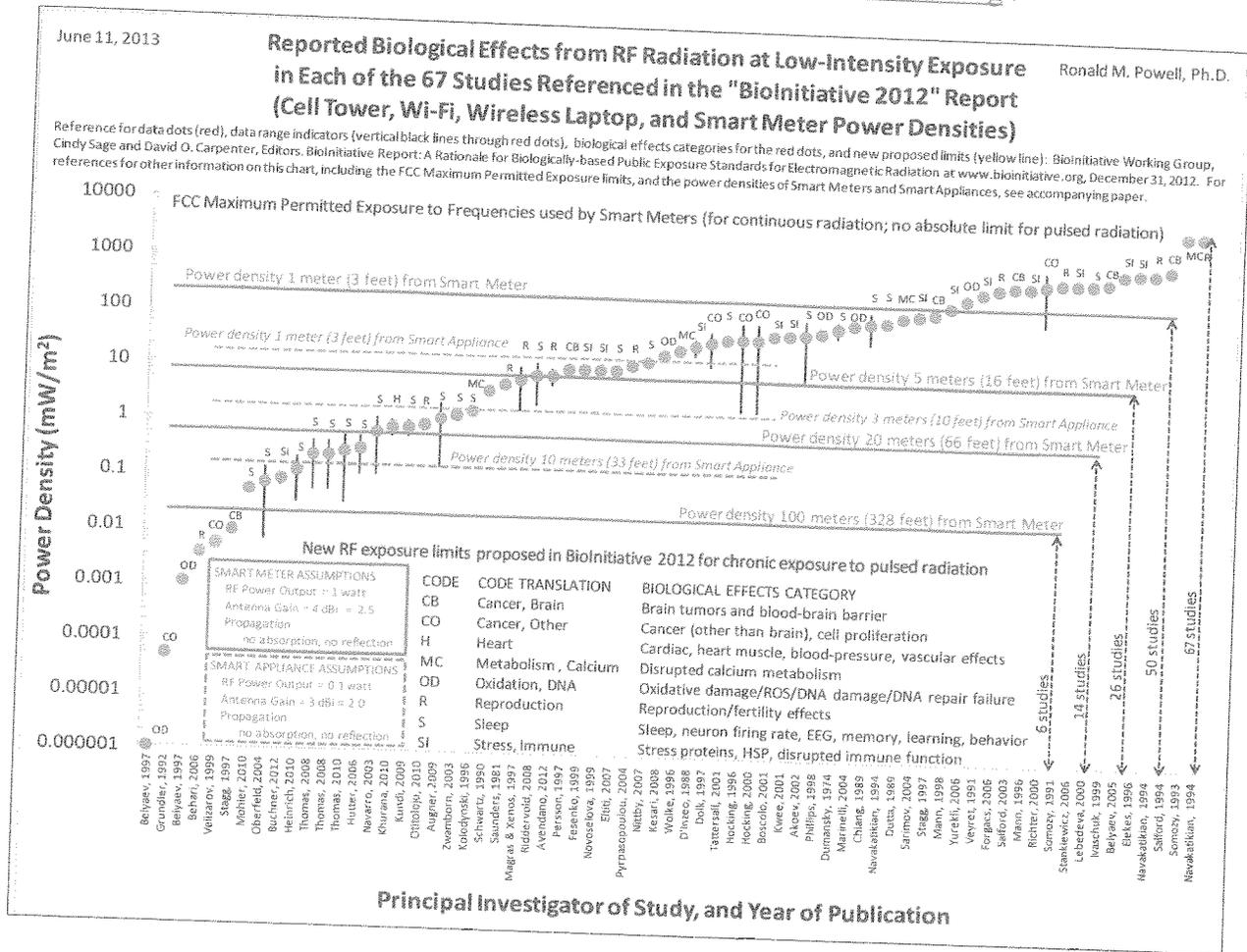


Figure 28. 2 ACS iPads, 3 privately owned iPads, 1 cell phone, and 1 Smart Phone simply turned on with a cumulative effect without accessing the Internet. Reads 1800 $\mu\text{W}/\text{m}^2$.

John measured 2 Almont Community School (ACS) issued iPads, 3 privately owned iPads, 1 cell phone, and 1 Smart Phone simply turned on with a cumulative effect without accessing the internet and found 1800 $\mu\text{W}/\text{m}^2$ (Figure 28). One of two WiFi routers in the home measured 1856 $\mu\text{W}/\text{m}^2$.

High radio frequency signals were apparent in the school as well as in the home.

The Biological Effects Chart below was prepared by Ronald M. Powell, Ph.D., from Harvard University in cooperation with Cindy Sage and Dr. David O. Carpenter, M.D., Editors of Bioinitiative Report: A Rationale for Biologically-based Public Exposure Standards for Electromagnetic Radiation, December 31, 2012, <http://www.bioinitiative.org>.



3-3. Other EMF Studies

Cyril W Smith, Physicist, working for and with the cooperation of Breakspear Hospital where he had been helping electrically hypersensitive patients since 1982, noted that “when a sensitivity reaction occurs, some regulatory system within the body has ceased to function properly and gives alarm signals, calling for an unjustified panic reaction. Usually it is the autonomic nervous system (ANS) which is the first to become compromised in this way. This system controls all the involuntary body functions. Thus, any part or function of the body might become affected by the same allergen acting in different people which is why such effects do not show up in medical statistics [12].”

At the Breakspear Hospital, about 10% of all patients with chemical, nutritional, or particulate sensitivities had acquired electromagnetic sensitivities. Tests often showed stress coming from some common environmental frequency such as the power supply (50 Hz in UK,

60 Hz in North America) or the 2.45 GHz frequency of microwave cookers and other devices using this frequency which can effect L- to D- isomerisation in amino acids.

Dr. Samuel Milham, MD, MPH, author of *Dirty Electricity -- Electrification and the Diseases of Civilization*, was a medical epidemiologist at the Washington State Health Department. He measured PN-G in California, and the bad news is that a 50 KHz signal is present everywhere in urban and very rural areas, in the grid, in the earth, in building and house wiring, in the PNEV, and in the air. It originates in the switching power supplies of smart meters. The type of smart meter doesn't seem to matter. The oscilloscope peaks match exactly for the two channels being studied simultaneously. The ground voltage is higher where smart meters have been installed.

Ulrich Warnke, internationally renowned bioscientist at Saarland University especially noted for research centered on the effects of electromagnetic fields, proves that EMF affects bees, birds, and mankind [13].

3-4. Most Doctors Do Not Acknowledge EMF as a Possible Cause for Health Problems

In 2005 and 2006, farmers began to inquire about where they could find a doctor who could determine if their electrical problem was causing their health problems. After a long search, I was directed to Dr. William Rea, a Surgeon, in Dallas, Texas, who himself had become allergic to EMF and could no longer perform operations and had set up a "clean" clinic to test for all types of allergies.

I contacted Dr. Rea and sent him a presentation DVD entitled "EMF in Homes, Schools, and Workplaces" which I had prepared from studying electricity on farms and also the electricity emanating from cell phone antennae placed on a water tower about 600 feet from our home. He asked me to cut the presentation into two parts (one on animals and one on humans) and present them at the 25th Annual International Symposium on Health and Disease in Dallas, Texas, in 2007. Doctors were permitted to receive credit to renew their licenses by attending the Symposium.

Shortly after the 2007 trip, I took a local farmer, Mr. Chick, to Texas to be tested by Dr. Rea in his "clean" clinic. Mr. Chick was examined and his neuro-cardiovascular system was challenged with exposure to 2-4 mG magnetic field in controlled laboratory conditions by Dr. Rea and associated medical doctors at the Environmental Health Center-Dallas, Texas (10/07-10/11/2007). **The EHC-EMF Challenge exposure was less than at the Chick farm (2.5-6.5 mG).**

- Mr. Chick's body responded with changes in heart rate, heart rate variability, arrhythmia, blood pressure, remarkable electrocardiogram changes and muscle tremors.
- Mr. Chick was video-taped in the office while the tremors were shaking his body. Administration of a serotonin (neurotransmitter) antidote *i.m.* relieved the tremors.
- The EMF challenge results changed the hypothesis from "chance" probability to "direct effect per EMF cause" considered "affirmative proof" in application of scientific methods.

Since that time I have asked all doctors I visit for health problems if they think my health problems could be related to high-frequency electricity. Their answers have always been in the negative. I have had 2 quadruple by-passes, an aneurism, diabetes, glaucoma, prostate cancer, a stroke, and most recently lower eyelid cancer on both eyes.

During my last visit to my Ophthalmologist, who discovered the eyelid cancers, I asked him if he thought EMF could have caused the problem. He said that it was most likely caused by excess radiation from the sun. I also asked both the cancer surgeon and the reconstruction surgeon the same question and received the same response. When the Ophthalmologist directed me to another room to have a picture of my eye, I was situated near an electric plug, so I inserted a G-S Meter in the outlet and found 1268 microsurgers, a level I know to be dangerous to well-being.

A video by Dr. Deitrich Klinghardt, MD, PhD, entitled **Smart Meters & EMR -- The Health Crisis of Our Time**, does an excellent job of explaining the EMF problem. He is the founder of Sophia Health Institute and Klinghardt Academy. I strongly recommend that everyone view his presentation on the following website:

http://www.youtube.com/watch?v=b_wxM6IAFII.

4. Conclusions

Electromagnetic fields have been proven to be harmful to dairy cattle, other animals, and humans. It is extremely important that proper instruments be used for investigating EMF. Because universities and public utilities have not updated their testing procedures and universities receive grants from public utilities, they often come to wrong conclusions in regard to effects of EMF.

An extremely valuable document by Cindy Sage, disclosing the dangers of EMF can be viewed at: http://www.bioinitiative.org/report/wp-content/uploads/pdfs/sec01_2012_summary_for_public.pdf.

5. Acknowledgements

Special appreciation is expressed to Louis Hillman, M.A., who assisted me with the farm visits for transportation, setting up the experiments, making measurements, and recording results as well as taking photographs. I am most grateful for David Stetzer, Electrical Engineer, for coming from Wisconsin for farm visits, especially when I had a stroke, and for his associate, Dr. Martin Graham, who has always been available for assistance. I appreciate all the help received from Robert Cuny, Dominic and Lillian Cusumano, John Holeton, Verne and Jackie Lamphear, Jeff and Susan Janowiak, Rachel Fitchell, and the Reviewers who found this article worthy of publication. I am also grateful to my wife for assistance in preparing and editing the manuscript, and all the families who shared their technical and personal information for the benefit of neighbors and the advancement of public knowledge.

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Exhibit 4

From: HillsR@michigan.gov
To: Donag1@aol.com
Sent: 11/13/2014 12:04:23 P.M. Eastern Standard Time
Subj: RE: PSA: Smart Meters Meeting // Donald Hillman

Don, here is our position on Smart Meters. I also received the packet that Mary delivered to me the other morning. Thank you. Here is one of the key statements excerpted from the longer letter from our office that you should be aware of: "The Attorney General [has] argued that residential customers should be given a meaningful and fair opportunity to opt out of having a smart meter installed without being penalized by unwarranted and excessive charges." The full letter is reprinted below.

Rusty

The Attorney General has received a number of inquiries from citizens regarding smart meters. The letters, emails and telephone calls to this office raise various objections to the installation of smart meters, including concerns about health effects, safety, cost, privacy, and constitutional rights. To assist all people who have asked questions and raised concerns, the Attorney General has asked me to respond with information about what has happened and is happening in Michigan regarding smart meters.

Smart Meters

Two Michigan utility companies, DTE Electric Company (formerly known as Detroit Edison) and Consumers Energy, like utilities in many other states, are pursuing so-called "smart grid" and "advanced metering infrastructure" programs. A key element of these programs is replacing traditional analog electric meters with digital "smart meters." With the traditional meters, utilities measure each customer's electric usage for billing purposes by sending employees or contractors to "read" the meter in person. The new smart meters are designed to allow the utility to instead remotely measure the customer's electric usage through a small radio transmitter built into the meter.

Michigan Public Service Commission

Many of the complaints received by the Attorney General ask him to stop the installation of smart meters. By law, the Attorney General does not have the power to make that decision. The Legislature has granted the Michigan Public Service Commission the sole power to regulate Michigan utilities and to establish the terms and conditions under which they must operate. That includes the power to decide whether and under what conditions utilities may install smart meters, and what costs associated with smart meters utilities can collect from ratepayers.

The Commission consists of three members, all appointed by the governor. It is assisted by the Public Service Commission staff, which includes various professionals and specialists. By law, and the Commission's administrative rules, the Commission makes its decisions through an administrative process which includes notice to the public, opportunity for comment, and in some cases, through formal "contested case" hearings, where the parties present evidence to an administrative law judge who then makes a recommendation called a "proposal for decision" to the Commission. The Commission makes its decisions in formal written orders. Final orders of the Commission can be appealed to Michigan courts as

provided by law, within specified time limits. More information about the Commission is available at its website: <http://www.michigan.gov/mpsc/0,4639,7-159-16400---,00.html>

General Smart Meter Case in 2012

After many citizens and some local governments publicly expressed health and safety concerns and privacy questions related to smart meters, as well as the desire to opt-out of the new meters, the Commission issued an order opening MPSC Case No. U-17000 on January 12, 2012. The purpose of that case was to consider those concerns. The order required Michigan utilities to file written statements with the Commission explaining their smart meter programs and to respond to concerns about smart meters. Before and after the utilities filed their statements, numerous citizens filed comments with the Commission opposing smart meters. The record of that case is available at the Commission's electronic case filing website:

<http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=17000&submit.x=27&submit.y=14>.

The Attorney General, whose Special Litigation Unit often intervenes in utility rate cases at the Commission to challenge rate increases and advocate for the economic interests of utility customers, also filed written comments in the general smart meter case, No. U-17000. The Attorney General urged the Commission to require Michigan utilities to prove that their smart meter programs will produce net economic benefits for customers from smart meters equal to or exceeding charges for smart meter programs before the Commission authorizes or approves any further deployment of smart meters or any further recovery of smart meter costs from ratepayers. Second, the Attorney General's comments argued that residential customers should be given a meaningful and fair opportunity to opt out of having a smart meter installed without being penalized by unwarranted and excessive charges.

Commission Decision on Health and Safety Issues

On June 29, 2012, the Commission's Staff filed a 32-page report analyzing the information received. On September 11, 2012, the Commission issued an order in case U-17000. The order accepts the report filed by the Commission's Staff, concludes the health risk from the installation and operation of metering systems using radio transmitters is insignificant, and concludes appropriate federal health and safety regulations provide assurance that smart meters represent a safe technology. But the order said the Commission will continue to review the costs and benefits of smart meters on a case-by-case basis in future rate cases where the utilities request authority to recover from ratepayers the costs of installing the meters.

Commission Decisions on Opting Out

The Commission's September 11, 2012 order in case U-17000 agreed Michigan utilities must permit residential customers to opt out — based on "cost-of-service" principles. It required DTE Electric and Consumers Energy to file proposed opt-out tariffs (written descriptions of the terms, conditions, and charges) in contested cases so that the Commission could conduct hearings and adopt approved terms and conditions under which those utilities must permit residential customers who want to do so to opt-out.

After the Commission issued its order in case U-17000, it separately considered and ultimately approved opt-out tariffs for DTE Electric Company in case U-17053 [record available at: <http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=17053&submit.x=32&submit.y=21>] and for Consumers Energy Company in case U-17087 [record available at: <http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=17087&submit.x=18&submit.y=8>]. The Attorney General participated in both these opt-out cases and argued that residential customers should be allowed to opt-out and should be allowed to keep their existing analog meters if they decide to opt-out. The Commission authorized Detroit Edison and Consumers Energy to replace analog meters with digital smart meters but ruled that for customers who want to opt-out, the utilities must disable radio transmitters inside smart meters so they will not send radio signals. Those orders also authorized the

utilities to bill additional up-front and monthly charges to customers who choose to opt-out of transmitting meters. In U-17053, some citizens intervened as individual customers and filed evidence about issues concerning health and safety and privacy issues, but the Commission struck the proposed evidence because the Commission had previously decided health and safety issues in U-17000 and because it was separately considering privacy issues in another case discussed below. So the Commission ruled those issues were outside the scope of the opt-out cases. Individuals who opposed the utilities limited opt-out proposals in those cases have filed appeals from those decisions in the Michigan Court of Appeals.

Commission Decisions on Customer Data Privacy

With regard to data privacy concerns, the September 11, 2012 order in the general smart meter case, U-17000, initiated a new case to review and decide what requirements utilities must follow to protect the privacy of customers' personal information. The new case is MPSC Case U-17102. The record is available at: <http://efile.mpsc.state.mi.us/efile/viewcase.php?casenum=17102&submit.x=17&submit.y=11> In that case, the Commission issued an order on June 28, 2013, establishing a framework for addressing customer privacy concerns, and directed DTE Electric, and Consumers Energy to propose new privacy protection tariffs, and provide their customers with notice and an opportunity to comment on the proposals. After considering the proposals and the comments submitted in the record, the Commission issued a final order on October 17, 2013. In that order the Commission determined that an acceptable data privacy policy should limit the collection, use, or disclosure of any customer information to accomplishing "primary utility purposes" only. It said that if the utility wishes to collect, use, or disclose customer information for other purposes, it must obtain informed consent from the customer in advance. The Commission further said that "primary utility purposes" includes not only traditional utility service but also "all other regulated programs including energy efficiency, demand management, renewable energy, and low-income programs."

Recovery of Smart Meter Costs from Ratepayers

Under Michigan law, public utilities regulated by the Commission may only recover their costs, including costs for implementing their smart meter programs, from utility ratepayers if the rates are approved by the Commission. To obtain approval, the utilities are required to show that the proposed rates are "just and reasonable." In a series of rate cases, DTE Electric and Consumers Energy have requested recovery of the costs of various stages of their respective Advanced Metering Infrastructure/Smart Meter programs.

As noted above, the Attorney General, through his Special Litigation Unit, frequently intervenes in utility rate cases to advocate for the economic interests of all ratepayers by challenging unjustified rate increases. In a series of contested rate cases before the Commission, the Attorney General has consistently opposed requests by the utilities to impose the costs of their smart meter programs on their customers. In those cases the Attorney General has argued that because the utility failed to prove that projected savings to customers from their smart meter programs are real and will outweigh the costs, the rate increases are not just and reasonable. While the Commission has so far ruled in favor of the utilities on these issues, the Attorney General has appealed and is continuing to appeal those decisions in the Michigan Court of Appeals. For example, in *In the application of Detroit Edison Company to increase rates*, 296 Mich App 101; 817 NW2d 630 (2012) [available at http://publicdocs.courts.mi.gov:81/OPINIONS/FINAL/COA/20120410_C296374_47_410-296374-FINAL.PDF], the Court of Appeals agreed with the Attorney General that the costs were not properly supported and sent the case back to the Commission, where the Attorney General is still fighting the request. And the Attorney General is currently appealing a Commission order in case U-17087 approving Consumers Energy's request to recover \$118 million for the second phase of its smart meter program. While we do not know what the final outcome of these cases will be, the Attorney General is continuing to challenge unjustified rate increases associated with smart meters.

Constitutional Concerns

Some of the people who have contacted the Attorney General have suggested that the entry of utility employees or contractors on their property to install smart meters would violate their constitutionally protected property rights. As noted above, the Legislature has vested the Commission with exclusive authority to regulate the terms and conditions of utility service provided by certain utilities, including DTE Electric and Consumers Energy. When a customer agrees to buy electric service, the customer gives implied consent to the utility for purposes of accessing infrastructure and equipment that support the customer's electric service, and the regulated utility agrees to comply with the terms and conditions established under applicable statutes, rules, and Commission orders. People have certain rights to keep others off or away from their private property, but when a customer agrees to buy electric service from a regulated utility, the customer waives the right to keep a utility off of the customer's property to the extent that the utility complies with all provisions of applicable statutes, rules, and orders that permit a utility to enter a customer's premises for specific purposes, such as accessing or replacing a meter owned by the utility.

Conclusion

In summary, the Public Service Commission has issued orders authorizing DTE Electric Company and Consumers Energy Company to install smart meters and has decided not to allow customers to keep existing analog meters. If residential customers agree to pay additional charges to opt-out, then the Commission ordered the utilities to disable the transmitters inside the new smart meters. Some individuals have appealed those Commission orders. In addition, the Attorney General is continuing to fight requests by DTE Electric and Consumers Energy to recover the costs of their smart meter programs in their rates because the utilities have yet to demonstrate that the claimed benefits of the programs outweigh the costs.

If you wish to obtain more information about smart meters, the Public Service Commission's website contains information about smart meters at the following internet links:

http://www.michigan.gov/mpsc/0,1607,7-159-56137_58213---,00.html#smartmeters

<http://www.michigan.gov/mpsc/0,1607,7-159-56137-250041--,00.html>

I hope the information I have provided you in this letter will assist you in understanding what has happened and in deciding what your options are, even though you may disagree with the orders described above. If you wish to obtain further advice, you should consult a private attorney, who could and would directly represent your interests and could provide individual advice. The law does not permit the Attorney General to give legal advice to individual citizens or to appear on a private citizen's behalf.



Updated 5

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Electromagnetic and Radiofrequency Fields Effects on Human Health Position Paper Summary

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- AAEM has been studying and treating the effects of the environment on health for over 50 years.
- AAEM physicians have been seeing patients who are symptomatic from electromagnetic frequency (EMF) exposure for more than 20 years.
- There has been a massive increase in radiofrequency (RF) exposure from wireless devices *and* reports of hypersensitivity and disease due to EMF and RF exposure in the last 5 years.
- Multiple studies correlate EMF and RF exposure with the following:
 - Neurological disease - Parkinson's, Alzheimer's, Lou Gehrig's disease, headaches, dizziness, ADD, anxiety, depression, sleep disorders, fatigue, tremors, unconsciousness, memory loss, autonomic nervous system dysfunction, paresthesias, visual disruption
 - Cardiac disease - Arrhythmia, tachycardia, edema, flushing
 - Lung disease - chest tightness, difficulty breathing, decreased lung function
 - Reproductive disorders, genetic defects, cancer
 - Immune dysfunction
 - Electromagnetic Hypersensitivity
 - Musculoskeletal effects - pain, muscle spasm
 - Gastrointestinal effects
 - Dermal effects - itching, burning, pain
- Electromagnetic Hypersensitivity has been documented in controlled, double blinded trials.
- EMF and RF fields act over long distances, imprinting the body with these fields, creating long lasting, adverse health effects.
- The interaction of electromagnetic fields and human bodies has long range effects, which cannot be shielded.
- The human body is affected by the magnetic vector component of the electromagnetic field, which cannot be shielded.
- Understanding is needed that Electromagnetic Hypersensitivity is a growing world wide problem.
- Accommodation for health conditions regarding EMF and RF exposure are needed.
- Control of this electrical environment is needed to protect society.
- Safer technology is needed.
- Independent studies are needed to understand health effects from EMF and RF exposure.
- Immediate caution on Smart Meter installation is needed.

References available in the full AAEM position paper:
http://aaemonline.org/emf_rf_position.html

Submitted by Amy L. Dean, DO, FAAEM