Case No. C-2015-2474602
PENNSYLVANIA PUBLIC UTILITY COMMISSION
CATHERINE J. FROMPOVICH

vs.

PECO ENERGY COMPANY

CATHERINE J FROMPOVICH MOTION FOR DECREE OF RELIEF FROM ACT 129 AND BRIEF IN SUPPORT

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I. INTRODUCTION

Catherine J. Frompovich is a *Pro Se* complainant protesting the mandated retrofitting of a PECO AMI Smart Meter on to her home electric service. Frompovich states the Legislative History of Act 129 (2008), i.e., HB2200 as passed by the State Legislature, is at variance with what the PA Public Utility Commission interpreted as mandatory during its writing of implementation regulations for utilities regarding Act 129. Frompovich, however, is deemed to be in violation of PA Act 129. Frompovich pleads her legal rights under the Americans with Disabilities Amendments Act, the U.S. Constitution and the Pennsylvania Constitution.

II. HISTORY OF THE PROCEEDING

February 14, 2015 Frompovich letter to PECO refusing AMI Smart Meter

February 19, 2015 PECO/AMI Deployment Project Manager Brenda Eison letter to Frompovich

February 20, 2015 PECO/Attorney Shawane Lee's letter to Frompovich

February 25, 2015 Frompovich letter to PECO/Attorney Shawane Lee

March 9, 2015 PECO/Attorney Shawane Lee letter to Frompovich

March 16, 2015 Frompovich letter to PECO/Attorney Shawane Lee

March 20, 2015 PECO/Attorney Shawane Lee letter to Frompovich

March 24, 2015 Frompovich letter to PECO/Attorney Shawane Lee

March 24, 2015 Frompovich filed formal complaint with PA PUC

April 10, 2015 PECO filed an Answer and New Matter acknowledging Frompovich's request to opt out of a smart meter due to being a cancer survivor and health concerns

April 10, 2015 PECO also filed Preliminary Objection alleging Frompovich's complaint was legally insufficient

June 15, 2015 ALJ Barnes granted PECO's Preliminary Objection and dismissed Frompovich's complaint on basis there was no provision in the law for Opt-out

June 26, 2015 Frompovich filed Exceptions

July 13, 2015 FECO filed Replies to Exceptions

April 21, 2016 PA PUC Public Meeting wherein the PUC granted, in part, Mrs. Frompovich's Exceptions. Five Commissioners were present; one dissent (Witmer)

May 6, 2016 PA PUC letter informing Frompovich of a hearing date June 27, 2016 before ALJ Angela T. Jones at 801 Market St., Philadelphia, PA at 10AM

June 16, 2016 Frompovich USPS submission of her 75-page testimony to all parties involved

June 21, 2016 ALJs Darlene D. Heep and Christopher P. Pell Order Granting Motion for Admission of *Pro Hac Vice* Thomas Carl Watson, Esq.

July 6, 2016 PA PUC letter informing Frompovich of new hearing dates (Nov. 2 & 3, 2016) before ALJs Heep & Pell

October 21, 2016 Frompovich USPS submission of her 195-page testimony to all parties involved

November 2 & 3, 2016 PA PUC hearing before ALJs Heep & Pell

December 15, 2016 Briefing Order to Frompovich

III. SUMMARY OF THE CASE

1. Plaintiff Catherine J. Frompovich filed a formal Complaint before the Pennsylvania Public Utility Commission on March 24, 2014 in order to prevent PECO Energy Company from retrofitting an AMI Smart Meter on to her home's electric service at 23 Cavendish Drive, Ambler, Pennsylvania. As a result of the PA PUC Public Meeting April 21, 2016 (2474602-

OSA)[1], Frompovich's case proceeded to a hearing before the Pennsylvania Public Utility Administrative Law Court on November 2-3, 2016.

2. The main reason for Frompovich's rejection of the PECO Smart Meter is her health status as a breast cancer survivor going on six years. Frompovich is a retired complementary healthcare professional (Nutrition and Holistic Health Sciences) and an active consumer health researcher and journalist since the late 1970s. In that capacity, Frompovich accesses published peer review science papers and journals, including those indicating microwave technologies EMFs/RFs produce non-thermal radiations with attributed non-thermal adverse health effects, one effect being cancer. Frompovich wants to avoid those exposures coming over her home's electric wires inside house walls and, therefore, invokes her legal ground and Constitutional rights regarding her health for implementing and enforcing her unalienable rights to self-determination, **specifically as a breast cancer survivor**, to avoid scientifically-proven since the 1930s[2], what's called "non-thermal adverse health effects" emitted by microwave technologies and, as in the case at hand, the AMI Smart Meter, which PECO retrofits and operates using two-way microwave technology. PECO requires a retrofit of their *Flexnet* Smart Meter onto her house electric meter.

3. PECO's position is that it must abide by Pennsylvania Act 129 (2008) which mandates AMI Smart Meters be retrofitted onto electric, natural gas and water utility companies (with 100,000 or more customers) customer meters. However, Act 129 makes no provisions for Opt-outs or other "grandfathered" exceptions or exemptions, which is highly unusual since many U.S. states—even several states where Exelon, parent company of PECO, operates facilities do

[1] http://www.puc.pa.gov//pcdocs/1433962.pdf

[2] Electrosensitivity, EHS 1932; Microwave hearing (tinnitus) 1962; Blood-brain barrier leakage 1979; Depression, suicide 1979; Alzheimer's disease 2009; Brain tumors, glioma, etc. 2009; **Tumor production 2015**.

provide Opt-outs and/or provisions for accommodating non-compliant customers. As of November 6, 2016, those states[3] PUCs enforcing certain Opt-outs from AMI Smart Meters installations, and/or fees for non-compliance, or other legal accommodations include Arizona, California, Colorado, Florida, Georgia, Hawaii, Illinois, Maine, Maryland, Massachusetts, Michigan, Nevada, New Mexico, Ohio, Oklahoma, Oregon, Texas, Vermont, Virginia, but New Hampshire, however, requires an Opt-IN, while in Washington State, the Port Angeles City Council Public Works and Utilities ended the Smart Meter program. *"City Council approved a $1.8 million settlement with Mueller Systems LLC to end the "Smart" Meter program. All water and electric meters will be free of the controversial, electromagnetic Smart Meter components.[4]"*

4. Frompovich states her position at law is protected under the **U.S. Americans with Disabilities Act Amendments Act (ADAAA)**[5]; the **U.S. Constitution**[6]; and the **Pennsylvania Constitution** (*enjoying and defending life and liberty, of acquiring, possessing and protecting property and reputation, and of pursuing their own happiness.*[7]). Furthermore, the **U.S. Department of Labor's Office of Disability Employment Policy *funded* the Job Accommodation Network (JAN),** (Morgantown, W. Virginia), **"Job Accommodations for People with Electrical Sensitivity"**[8] where, on page 2 of that document, it states:

> "The National Institute for Occupational Safety and Health (NIOSH) and the Centers for Disease Control and Prevention (CDC) have published guidelines for 'safe' levels of human exposure in a publication called, Manual for Measuring Occupational

[3] http://www.stopsmartmetersbc.com/wp-content/uploads/2015/03/OPT-OUT-FEES.pdf
[4] http://www.stopsmartmetersbc.com/wp-content/uploads/2015/03/OPT-OUT-FEES.pdf
[5] Americans with Disabilities Act of 2008 Amendments Act, Pub. L. 110-325: 42 U.S.C. 12102(2); 42 U.S.C. 12102(4)(A); 42 U.S.C. 12102(3); 42 U.S.C. 12205a..
[6] U.S. Const. amend. IV, V, XIV
[7] Pa. Const., art. 1 §1
[8] https://askjan.org/media/eaps/employmentelectricalEAP.doc

Electric and Magnetic Field Exposures. However, the nature of electromagnetic sensitivity is such that even levels that are deemed safe for the general public can cause **trigger symptoms** for **individuals who are hypersensitive**. Individuals affected by electromagnetic sensitivity experience symptoms at far lower levels and therefore may need accommodations in the workplace beyond the safe levels of exposure indicated in the manual."

5. Frompovich introduces as *Brief Exhibit No. 8 United Nations "Convention on the Rights of Persons with Disabilities and Optional Protocol"*[9] wherein various articles have dove-tail effects with the ADAAA, thereby reaffirming Frompovich's rights:

Article 2 "Definitions" (pg. 4)
"Reasonable accommodation" means necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms;

Article 4 General Obligations (pg. 5)
(a) To adopt all appropriate legislative, administrative and other measures for the implementation of the rights recognized in the present Convention;
(b) To take all appropriate measures, including legislation, to modify or abolish existing laws, regulations, customs and practices that constitute discrimination against persons with disabilities;

Article 14 Liberty and security of person (pg. 11)
2. States Parties shall ensure that if persons with disabilities are deprived of their liberty through any process, they are, on an equal basis with others, entitled to guarantees in accordance with international human rights law and shall be treated in compliance with the objectives and principles of the present Convention, including by provision of reasonable accommodation.

Article 17 Protecting the integrity of the person (pg. 13)
Every person with disabilities has a right to respect for his or her physical and mental integrity on an equal basis with others.

Additionally, there is the **White House Consumer Privacy Bill of Rights Report** (February 2012)[10] regarding personal data collected in the current "data-mining" culture, which

[9] http://www.un.org/disabilities/documents/convention/convoptprot-e.pdf

also impacts Frompovich and supports her position regarding "*the right to be left alone.*" Justice Louis D. Brandies' dissenting opinion in *Olmstead v. United States,* 277 U.S. 438 apparently was the first (1928) to recognize the hazard(s) modern technology would pose for citizens and their privacy, which now must be updated to include citizens' health issues. In Frompovich's case those due to EMFs/RFs emitted by microwave technologies, as Frompovich contends. *Olmstead* was overturned by *Katz v. US,* 389 US 347 (1967).

6. Frompovich introduced substantial EMF/RF-and-cancer connections from scientific documentation in the 195 pages she submitted to this Honorable Court, PA PUC Secretary Chiavetta and PECO attorneys prior to the November 2-3, 2016 hearing. Those documents included 15 published human studies (1986 to 2005) regarding breast cancer and EMF/ELF/RF as part of a compendium of almost 240 published studies regarding breast and other cancers and EMF/ELF/RF, which were summarily objected to by PECO attorneys and not included as part of Frompovich's testimony. *Cf. Transcript Pg. 36 (7-10) and Pg. 67 (18-21)*

7. Frompovich stresses her body and health are her foremost private personal properties and, therefore, invokes her U.S. Constitution and Pennsylvania Constitution rights, plus the American with Disabilities Act Amendments Act as her legal rights and protections, and are germane in her case.

8. Additionally, Frompovich brings attention to the Legislative History of Act 129 and the fact the Pennsylvania Public Utility Commission implemented an agency-imposed regulation that precludes options and redress against Act 129 due to the PA PUC's interpretation of HB2200 during its rule- and regulations-making procedures and protocols for implementing

[10] https://www.whitehouse.gov/sites/default/files/privacy-final.pdf

HB2200 signed into law as Act 129 that negatively impacts Frompovich's status as a breast cancer survivor who is legally entitled to protect her health.

9. Act 129 (2008) PA PUC implementation regulations are incompatible with the legislative intent and history of HB2200[11] and, therefore, legally at variance with what was published February 11, 2008 in the PA *House Journal* pp. 386-403 and October 8, 2008 in the PA *Senate Journal*, pp. 2626-2631. Therefore, the PA PUC's smart meter implementation regulations to utility companies must be questioned by Frompovich as the PA PUC overstepping its agency authority. Supreme Court Justice Sotomayor writing for the court in *Perez v. Mortgage Bankers Association* 135 S. Ct. 1199 (2015) states "it is the court that ultimately decides whether a given regulation means what the agency says. . . ."

10. Moreover, Frompovich never requested an AMI Smart Meter, nor did she agree to pay for one (as apparently may be charged in monthly PECO electric billings). However, Frompovich sent by USPS mail to PECO legal notice of her rejection of a retrofitted AMI Smart Meter.

11. Concomitantly, the Pennsylvania State Legislature members have introduced various Opt-out bills over the last four years to clarify that **AMI Smart Meters were not to be mandated**, but due to PA House Consumer Affairs Committee Chairman Robert Godshall's refusal to call those House bills to the floor for a vote, each has languished and become *sine die.* Those actions have placed Frompovich in the trying position of having to defend her health relative to unfair and health-compromising PA PUC interpretations and implementation of HB2200 legislation that effectively has mandated and imposed negative health impacts, effects

[11] HB2200 §2807 (f)7 (2) (i) *"upon request from a customer that agrees to pay the cost of the smart meter at the time of the request."* http://www.legis.state.pa.us/WU01/LI/LI/US/HTM/2008/0/0129..HTM

and consequences for Frompovich, as a breast cancer survivor, and other Pennsylvanians who suffer from/with EHS or MCS or other debilitating diseases and/or disabilities as defined under the three "prongs" of the ADAAA.

12. Further compounding Frompovich's untenable and compromising health-compromising position, the Pennsylvania Public Utility Commission is not abiding by its "Mission Statement," which states:

> **Mission Statement:** The Pennsylvania Public Utility Commission balances the needs of consumers and utilities; ensures ***safe and reliable utility service*** at reasonable rates; protects the public interest; educates consumers to make independent and informed utility choices; furthers economic development; and fosters new technologies and competitive markets in an environmentally sound manner.[12]

13. Frompovich alleges the **PA PUC is NOT ensuring safe and reliable utility service** from PECO and the other electric distribution companies that retrofit AMI Smart Meters in Pennsylvania. Fires, explosions, hot sockets, damaged meter jaws, dirty electricity (electrical pollution), and EMF/RF pulses with non-thermal radiation emitted from AMI Smart Meters constitute UNSAFE living conditions as reported by various media, independent scientists, researchers and published science literature, which PECO and its experts deny and proclaim as not factual.

14. **Here is the crux of this case:** The **notable disparities** between 1) Act 129 Legislative History and PA PUC's implementation orders mandating smart meters; and 2) independent and academic research updating evolving **microwave technology and science regarding cancers**, and breast cancer in particular, *versus* the outdated microwave-industry

[12] PUC http://www.puc.state.pa.us/about_puc.aspx

professional societies protestations, e.g., ICNIRP, et al, who deny EMFs/RFs cause non-thermal, or what PECO's expert called "A-thermal" effects, exist.

15. Based upon the testimony record, PECO's medical expert Dr. Mark A. Israel's information regarding EMFs and cancer and/or other aspects of non-thermal adverse health effects from microwave electromagnetic frequencies are at variance with published science since the 1930s.

16. Frompovich tried to establish that fact by introducing numerous published cancer studies which were rejected or disqualified by PECO's attorneys' objections, which the Court sustained.

17. In addition to Frompovich's concerns about EMFs/RFs and non-thermal adverse health effects from PECO's AMI Smart Meter emissions, she has grave concerns about their safety. Genuine "safe" and "safety" issues actually have occurred with PECO AMI Smart Meters, as evidenced by PECO's admission in its **"Smart Meter Universal Deployment Plan, January 18, 2013"** where on page 2 this appears:

> "**After experiencing a number of meter events during the spring and early summer of 2012,** PECO temporarily suspended the installation of meters to additional customers while those problems were thoroughly investigated."[13]

Those "meter events" were fires and explosions[14],[15],[16],[17] which had been reported in multimedia news reports.

18. Frompovich asks nothing more of this Honorable Court, the PA PUC and PECO than to exercise her *unalienable and indefeasible rights* under the American with Disabilities Act

[13] https://www.peco.com/SiteCollectionDocuments/Universal%20Deployment%20Plan%20(1-17).pdf **Pp. 2-3**
[14] http://www.nbcphiladelphia.com/news/business/PECO-Smart-Meter-Replace-Fire-166466686.html
[15] http://www.buckscountycouriertimes.com/news/local/electric-meter-blamed-for-bensalem-apartment-fire/article_93cf65bb-a298-5978-a88e-464c2f4451e1.html
[16] http://patch.com/pennsylvania/newtown-pa/peco-smart-meter-may-have-lead-to-fires
[17] http://www.activistpost.com/2015/06/smart-meters-fire-living-hell-and.html

Amendments Act, the U.S. Constitution, and the Pennsylvania Constitution to live her life free of PECO's *Flexnet* or any utility company's AMI Smart Meter(s) and their EMF/RF radiation emissions as her inherent right of self-determination to protect her body and health as a breast cancer survivor specifically from EMFs/RFs associated with two-way microwave technology transmissions/emissions from a PECO *Flexnet* or any AMI Smart Meter pulsing onto her home's electrical wiring.

IV. SUMMARY OF THE ARGUMENT WITH STATEMENT OF FACTS

19. Frompovich was diagnosed with breast cancer July 24, 2011.

20. Frompovich has been under holistic cancer treatment protocol since that time to date, with periodic evaluations.

21. Frompovich has been a PECO customer since May 25, 2007 with all bills paid in full and no late charges at any time.

22. Frompovich refused in writing the PECO AMI Smart Meter based upon:

a. Her status as a breast cancer survivor protected under and by the "the three prongs" of the Americans with Disabilities Act Amendments Act[18] and

b. HB2200[19] signed into law as Act 129 (2008) is at variance with the intent and Legislative History of HB2200 as published February 11, 2008 in the *PA House Journal* pp. 386-403 and October 8, 2008 in the *PA Senate Journal*, pp. 2626-2631.

The Pennsylvania Legislature confirmed the variance fact plus its intent to correct mandatory smart meter installations when members of the House and Senate of the

[18] Americans with Disabilities Act of 2008 Amendments Act, Pub. L. 110-325: 42 U.S.C.§12102(2); 42 U.S.C. §12102(4)(A); 42 U.S.C. §12102(3); 42 U.S.C. §12205a

[19] http://www.legis.state.pa.us/WU01/LI/LI/US/HTM/2008/0/0129..HTM No. 2008-129

PA State Legislature introduced several bills, i.e., HB899, HB902, HB906 (2013-14); Bills HB393, HB394, HB395, HB396 (2015-16); plus State Rep. Mike Reese (R., Westmoreland) released to the media on December 15, 2016[20] he plans to introduce another round of smart meter opt-out bills into the 2017-18 legislative session.

In the PA Senate, several opt-out bills were introduced: SB816, SB818, SB817 (2013-14) indicating bipartisan intent to clarify the variance and misinterpretation of HB2200/Act 129 regarding smart meters as being mandatory and correct that since, smart meter implementation specifically was addressed in **HB2200 §2807(f)7(2)**[21]:

> **(2) Electric distribution companies shall furnish smart meter technology as follows:**
> **(i) Upon request from a customer that agrees to pay the cost of the smart meter at the time of the request.**
> **(ii) In new building construction.**
> **(iii) In accordance with a depreciation schedule not to exceed 15 years.**

23. Furthermore,

A. Frompovich never complied with (i) above: "Upon request from a customer that agrees to pay the cost of the smart meter at the time of the request." Furthermore, Frompovich sent PECO Energy Company written legal notice of her refusal to have a retrofitted AMI Smart Meter placed on her home's utility. That provision was assured her (and all Pennsylvanians) in HB2200 §2807(f)7(2)(i), but misinterpreted by the PA PUC's implementation regulations provided to electric distribution companies and other utilities, e.g., natural gas and water, as smart meters being mandatory, which has led to Frompovich's PA PUC complaint and this case. Frompovich provided numerous peer-review science published papers regarding

[20] http://www.philly.com/philly/business/Pa-lawmaker-hopes-legislature-has-wised-up-about-smart-meters.html
[21] http://www.legis.state.pa.us/WU01/LI/LI/US/HTM/2008/0/0129..HTM

EMF/RF non-ionizing radiation being implicated in various cancers, including breast cancer in males, females and *in vitro* animal studies, plus various other adverse health anomalies attributed to EMFs/RFs, which were rejected.

B. Frompovich contends her U.S. Constitutional rights[22],[23],[24] and Pennsylvania Constitutional rights[25] also are being abrogated, which she will discuss further in the Argument of the Case.

C. Frompovich testified before this Honorable Court November 2-3, 2016 to plead her case based upon the above facts.

D. Federal legislation, i.e., American with Disabilities Act Amendments Act,[26] has impact upon Frompovich's position at law.

E. Act 129 (2008) is at variance with the legislative intent and history of HB2200 as published February 11, 2008 in the *PA House Journal* pp. 386-403 and October 8, 2008 in the *PA Senate Journal,* pp. 2626-2631. Several Opt-out legislative bills have been introduced and co-sponsored in the 2013-14 and 2015-16 legislative sessions to correct the "mandates" regarding AMI Smart Meters formulated by the PA PUC's implementation regulations for Act 129.

F. Conflicts of Interest exist and removals have taken place within industry representative societies, especially ICNIRP. ICNIRP claims there are no non-thermal electromagnetics and adverse health effects, including cancer. PECO witnesses relied upon ICNIRP data as documentation to prove their position at law.

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[22] U.S. Const. amend. IV
[23] U.S. Const. amend. V
[24] U.S. Const. amend. XIV §2
[25] Pa. Const., art. 1 §1
[26] Pub. L. 110-325

V. ARGUMENT

24. Frompovich has been a breast cancer survivor ever since having been first diagnosed July 24, 2011. She feels her health should not be made a public discussion at court, as her health issue, cancer of the breast, is *non sequitur,* since health preservation is a vital right in her status as a citizen of the USA having indefeasible and unalienable rights which are being denied her by action of the PA PUC's misinterpretation of Act 129.

25. Frompovich has modified her lifestyle to eliminate, as humanly as possible, most exposures to microwave technologies and EMF/RF energies while enjoying a low-tech lifestyle, as established in her answers to PECO attorneys' interrogatories.

26. Frompovich is a holistic healthcare (**Complementary and Alternative Medicine** referred to as **CAM**) retired professional, active researcher in consumer health issues and journalist/writer since the late 1970s. Her area of expertise is in natural nutrition and holistic health sciences, which the allopathic medical paradigm rebuffs since it's not steeped in pharmacology, radiology or chemotherapy. Nevertheless, according to the **National Center for Complementary and Integrative Health,** *"In the United States, approximately 38 percent of adults (about 4 in 10) and approximately 12 percent of children (about 1 in 9) are using some form of CAM."*[27]

27. Frompovich has been a CAM patient, consumer, and advocate ever since the early 1970s when she literally had to save her life from conventional medicine mistakes. Conventional medicine is referred to as allopathy. PECO's expert medical witness, Dr. Mark A. Israel, M.D., practices allopathic medicine.

[27] https://nccih.nih.gov/research/statistics/2007/camsurvey_fs1.htm

28. One of the key tenets of holistic health and CAM is lifestyle: how it contributes to and often determines, underlies or exacerbates health issues. Therefore diet, nutrition, pollution, environments—both interior and exterior—including physiological, and electric pollution EMFs/RFs are factored into any protocol for attaining and maintaining wellness, especially for cancer patients who either are active or in remission.

29. As a consumer health researcher and in conjunction with her treating physician, Frompovich has determined that being exposed to the EMFs/RFs from PECO's *Flexnet* AMI Smart Meter would not be beneficial to her wellbeing and could trigger a recurrence of cancer, a risk she is not willing to take nor wants to be exposed to, and also has every right of self-determination to do so citing the Americans with Disabilities Act Amendments Act, the U.S. Constitution and the Pennsylvania Constitution in order to maintain her wellbeing without being exposed to EMF/RF electric pollution (dirty electricity) and its compromising non-thermal radiation being sent over her home's electrical wires.

ADAAA Section 1630.2 (G) Disability states:

> "This section of the regulation includes the basic three-part definition of the term 'disability' that was preserved but redefined in the ADA Amendments Act. For clarity, the Commission has referred to the first prong as 'actual disability,' to distinguish it from the second prong ('record of') and the third prong ('regarded as')."

ADAAA Section 1630.2 (J) Substantially Limits states:

> "Indeed, Congress anticipated that the first and second prongs of the definition of disability would 'be used only by people who are affirmatively seeking reasonable accommodations***' and that '[a]ny individual who has been discriminated against because of an impairment—short of being granted a reasonable accommodation ***-- should be bringing a claim under the third prong of the definition which will require no showing with regard to the severity of his or her impairment."

ADAAA Section 1630.2 (I) Major Life Activities states:

> "The link between particular impairments and various major bodily functions should not be difficult to identify. Because impairments, by definition, affect the functioning of

body systems, they will generally affect major bodily functions. For example, **cancer affects an individual's normal cell growth;** diabetes affects the operation of the pancreas and also the function of the endocrine system. Likewise, sickle cell disease affects the functions of the hemic system, lymphedema affects lymphatic functions, and rheumatoid arthritis affects musculoskeletal functions."

ADAAA Section 1630.2(j)(1)(ii) Significant or Severe Restriction Not Required; Nonetheless, Not Every Impairment Is Substantially Limiting

"10 ('While the limitation imposed by an impairment must be important, it need not rise to the level of severely restricting or significantly restricting the ability to perform a major life activity to qualify as a disability.')"

ADAAA Section 1630.2(j)(1)(iii) Substantial Limitation Should Not Be Primary Object of Attention; Extensive Analysis Not Needed

"Consequently, this rule of construction makes clear that the question of whether an impairment substantially limits a major life activity should not demand extensive analysis. As the legislative history explains, '[w]e expect that courts interpreting [the ADA] will not demand such an extensive analysis over whether a person's physical or mental impairment constitutes a disability'."

30. Frompovich respectfully points out that the PA PUC is bound to comply with the **Americans with Disabilities Act Amendments Act [ADA Amendments Act of 2008]**[28] and **Section 504 of the Rehabilitation Act of 1973**[29] regarding disabled customers, which prohibits discrimination on the basis of disability in any program that receives financial assistance from federal agencies.

31. Any business entity—and U.S. states—that accept federal funds also must comply with those federal Acts. PECO received $200 Million in matching federal funds, which is discussed below. In the year 2013, Pennsylvania received approximately $21.2 Billion in federal aid[30] or 30.4 percent of the state's general revenues. Therefore, it should be incumbent upon both the PA PUC and PECO to abide by the ADAAA.

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[28] Pub. L. 110-325

[29] 29 USC §794: Nondiscrimination under Federal grants and programs

[30] https://ballotpedia.org/Pennsylvania_state_budget_and_finances

32. Furthermore, can it be construed that the PA PUC[31] and PECO are in violation of federal law in view of the above, and Act 129, therefore, is unenforceable as a result of the PA PUC overstepping its administrative agency authority. Federal agencies possess powers to legislate, adjudicate, and enforce laws within their realm of delegated power, e.g., states that accept federal funds must abide by all federal regulations. Case in point:

33. The PA PUC must comply with the **Americans with Disabilities Act Amendments Act [ADA Amendments Act of 2008]**[32] and **Section 504 of the Rehabilitation Act of 1973**[33] regarding disabled customers, as defined within three ADAAA "prongs," which prohibits discrimination on the basis of disability. Compliance is required in any program receiving financial assistance from any federal agency. In the year 2013, Pennsylvania received approximately $21.2 Billion in federal aid[34] or 30.4 percent of the state's general revenues. Any business entity accepting federal funds also must comply with federal Acts. PECO received $200 Million in matching federal funds.

34. According to PECO's "**Smart Meter Universal Deployment Plan, January 18, 2013**"[35] *"PECO proposes to recover the costs of executing the Smart Meter Plan through its existing Smart Meter Cost Recovery Surcharge ("SMCRS"), which was implemented at the conclusion of the Phase One proceeding."* [Pg. 2] Additionally, PECO received $200 Million in matching federal funds, as evidenced in Public Meeting held April 22, 2010 at the Pennsylvania Utility Commission regarding Docket No. M-2009-2123944 Opinion and Order Transcript. "*U.S. Department of Energy (DOE) under its Smart Grid Investment Grant Program for $200*

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[31] Breyer, Stephen, et al., *Administrative Law & Regulatory Policy*, Fifth Edition, at p. 3 (Aspen Pub. 2001)
[32] Pub. L. 110-325
[33] 29 USC §794: Nondiscrimination under Federal grants and programs
[34] https://ballotpedia.org/Pennsylvania_state_budget_and_finances
[35] https://www.peco.com/SiteCollectionDocuments/Universal%20Deployment%20Plan%20(1-17).pdf Pp. 2-3

million in matching federal funds. By letter dated October 27, 2009, the DOE notified PECO that its application had been selected for award negotiations." [Meeting Transcript Pg. 18]

35. State agencies and boards cannot issue rules, regulations and policies that violate federal laws. If state laws violate or contradict a federal law, the federal statue preempts state law. The Supremacy Clause within Article VI of the U.S. Constitution[36] states federal law is the "supreme law of the land," which every state and its judges are required to follow, i.e., U.S. Constitution, laws and treatises of the federal government. Furthermore, the Doctrine of Preemption within the Supremacy Clause applies when laws are in conflict. Frompovich's health status as defined under the ADAAA prong number three[37], therefore, applies in her case as a breast cancer survivor and must be adhered to by the PA PUC and PECO.

36. Since the PA PUC formulated its smart meter rules and regulations based upon what the PA PUC *"believed"* the Pennsylvania Legislature meant, rather than what was voted on by the PA Legislature and published of record as **Legislative History**, Frompovich is being deprived of her rights. That PA PUC agency overstep of its agency powers has been illuminated by PA legislators, with relief sought and attempted, by various Opt-out bills numerous state legislators co-sponsored over the course of the past few years. None of those bills were permitted to be called for a vote or voted upon, specifically by House Consumer Affairs Chairman Robert Godshall, further denying Frompovich of her rights.

37. ***"There are three primary security risks associated with smart meters: physical risks, electrical risks, and software risks,"*** according to *Business Insider's Tech Insider*[38]. Frompovich testified there are non-thermal radiation adverse health effects from EMFs/RFs and

[36] U.S. Const. art. VI, cl.2
[37] Pub. L. 110-325
[38] http://www.businessinsider.com/the-smart-meter-report-forecasts-regional-breakdowns-costs-and-savings-for-a-top-iot-device-2015-4

tried introducing documentation to that effect, which was summarily objected to by PECO attorneys and in some instances sustained by the Court.

38. Frompovich, a retired holistic healthcare professional and active consumer health researcher and journalist since the late 1970s, stated physical risks from AMI Smart Meters include meter fires and non-thermal radiation health risks—specifically cancers, which summarily were denied and disregarded as "non-existent" by PECO's expert medical witness. PECO's expert testified there are no such 'phenomena' recognized by science as non-thermal health effects. However, science recognizes **terrestrial non-thermal radiation.** Non-thermal radiation effects also have been documented in animals, including birds.

39. The RF standards set by the Federal Communications Commission do not take into consideration lower standards necessary to protect humans from non-thermal radiation adverse events, as addressed in the Sage-Carpenter Comments[39] filed with the FCC (2013) regarding ET Docket No. 13-84 and ET Docket No. 03-137; see Recommendations to FCC, Page 5. *Cf. Brief Exhibit No. 1*

40. For the record, there is a non-thermal adverse health effects or electromagnetic hypersensitivity (EHS) advocacy group "**We Are The Evidence—Wireless Technology Injured Advocacy Group**"[40] founded by Attorney Dafna Tachover (Attorney licensed in NY and Israel; MBA). Statistically, there is a hidden marginalization of persons suffering with EHS which includes the following demographics:

26% of the USA population (Caress & Steinemann, 2003)
19% of the Swedish population (Johansson et al, 2005)
27% of the Danish population (Berg et al 2008)

[39] https://ecfsapi.fcc.gov/file/7520939954.pdf
[40] https://wearetheevidence.org/

32% of the German population (Hausteiner et al, 2005)[41]

41. The above percentages indicate a dramatic EHS health crisis at hand facing microwave technology providers and utility companies utilizing AMI Smart Meters regarding culpability **for health damages, including personal assault.**

> **At Common Law, an intentional act by one person that creates an apprehension in another of an imminent harmful or offensive contact** [is the definition of assault].
>
> An assault is carried out **by a threat of bodily harm coupled with an apparent, present ability to cause the harm.** It is both a crime and a TORT and, therefore, may result in either criminal or civil liability. Generally, the common law definition is the same in criminal and Tort Law. There is, however, an additional Criminal Law category of assault consisting of an attempted but unsuccessful Battery.
> Statutory definitions of assault in the various jurisdictions throughout the United States are not substantially different from the common-law definition.[42]

42. Therefore, the PA PUC's mandating AMI Smart Meters that emit EMFs/RFs non-thermal radiation, which can and do precipitate EHS harms on utility customers as evidenced by many complaints filed with the PA PUC, needs to be considered as an **assault on a person's physical body, mental, emotional and neurological health, and wellbeing**. Consequently, mandates from PA PUC for utility customers to live with pain and suffering or the fear of contracting cancer again, if one is a cancer survivor as in Frompovich's case, from being exposed to AMI Smart Meters, are contraindicated by the Pennsylvania Constitution[43] and federal law.

43. To elaborate further about living with pain and suffering from AMI Smart Meters, this Court heard testimony from various complainants regarding EHS, their health problems and

[41] Gibson, Pamela. Ecopsychology, Vol. 8, No. 2, June 2016
http://online.liebertpub.com/doi/abs/10.1089/eco.2016.0003
[42] http://legal-dictionary.thefreedictionary.com/assault
[43] Pa. Const., art. 1 §1

exacerbated issues, which PECO's expert Dr. Israel identified as "IEI"—idiopathy environmental intolerance[44].

44. However, PECO medical expert Dr. Israel contradicted himself when talking about IEI intolerances and EMF, which Frompovich points out as stated in the Transcript:

> Page 278 (14-18)
> PECO Attorney Watson Q. Let me ask you this. Is it generally accepted in the scientific or medical communities that idiopathic environmental intolerance to EMF and the variety of symptoms and conditions attributed to it are caused, contributed to or exacerbated by exposure to radiofrequency fields?
>
> Page 278 (25) Dr. Israel A. **It is not generally accepted**.
>
> Page 272 (14-16)
> Dr. Israel A. We typically refer to them as IEI, idiopathy environmental intolerance, and followed by whatever that intolerance is, **EMF,** some chemical, whatever.
>
> Page 274 (8-9)
> PECO Attorney Watson Q. Do I understand that you're telling us that IEI is simply neutral, a neutral way to describe –
>
> Page 274 (10-12)
> Dr. Israel A. That's the way the World Health Organization proposed, and I think **that's what's generally used amongst physicians today**.

45. If EMF intolerance generally is not accepted, according to Dr. Israel *cf. Pg. 278 (25)*, then why does Dr. Israel **make conflicting statements** on Transcript pages 272 and 274, specifically stating ***"that's what's generally used amongst physicians today."***

46. Dr. Israel's statement clearly supports, if not reinforces, Frompovich's claim that non-thermal radiation health effects from electric environments exist [*cf.* ***IEI/EMF*** *above*], and are identified specifically by the World Health Organization and physicians.

47. Furthermore, IEI or EHS complainants have filed formal complaints with the PA PUC and appeared before this Honorable Court. They include the late Susan Kreider, RN

[44] Transcript Pp. 272-73

(deceased Nov. 10, 2016) who suffered much physical and emotional distress as a result of PECO's AMI Smart Meter and the legal actions that ensued, Mary Paul, Maria Povacz, Laura Silberstein Murphy, Diane Van Schoyck and husband, who finally opted to get off the grid and install solar energy at a cost of $120,000.00, which not every PECO customer or Pennsylvania utility customer can afford to do in order to obtain relief from EMFs/RFs, EHS or IEI, or possible cancer "triggers" and still have access to electric power—a necessity of life in modern times.

48. According to the system of laws in the United States, all 50 states exist to defend our fundamental and natural rights[45], not create impossible situations or Catch-22s, specifically, health hazards for citizens who are individualistic in personality and body chemistry proclivities. An example of such proclivities is allergies, which can include gluten intolerance; peanut allergy; multiple chemical sensitivity (MCS) covered under the World Health Organization designation of IEI; and anaphylaxis, to mention a few. There are too many allergic responses to enumerate here with more being identified almost daily since man-made chemicals and new technologies present conditions humans have not evolved with over time and, therefore, can be reactive.

49. As a point of specific example, and germane to evaluate the case at hand, Frompovich introduces the **U.S. Library of Medicine,** which is lax in discussing allergies on its Internet website[46] since it does not include other "triggers", e.g., chemicals, pollution (electric or otherwise) plus heavy metal exposure under "Causes"—factors that precipitate reactive reflexes and/or conditions. Dr. Israel had difficulty with "triggers", i.e., *"I don't know what triggers*

[45] ***Madden v. Kentucky***, 309 U.S. 83 (1940)
[46] https://medlineplus.gov/ency/article/000005.htm

mean." Cf. Transcript Pg. 302 (10-14). "Triggers" is common parlance in medicine,[47] which physicians should be familiar with.

50. Frompovich respectfully uses the U.S. Library of Medicine example to illustrate what she and her testimony were up against as an "expert witness" for PECO: seemingly incompetent expertise due to a lack of broad medical knowledge and information, plus PECO's expert's disregard and PECO attorneys' constant objections to EMF/RF-cancer-associated scientific information Frompovich tried introducing into the record, as evidenced in the Transcript.

51. As a matter of legal point, lawsuits have been filed regarding smart meters *cf. Brief Exhibit No. 9 Smart Meter Lawsuits*, especially in California concerning various health issues with a wrongful death-smart meter fire suit filed against Pacific Gas & Electric (PG&E), which was settled. Health issues revolve around AMI Smart Meters just about anywhere they have been retrofitted.

52. In California, there had been 16 plaintiffs filing lawsuits against Edison and PG&E alleging headaches, loss of sleep and tinnitus, heart attack, **cancer** and medical implant interference/defibrillator shut offs AFTER the new wireless smart meters were installed.

53. An October 2016 lawsuit[48] filed in the Circuit Court of Rockingham County, Virginia, against Virginia Electric and Power Company has Plaintiff Donna Kinsey seeking health damages in the amount of $3.5 Million regarding health problems after two smart meters were installed on the homeowner's property.

54. The City of Naperville, Illinois, settled a violation of U.S. Constitutional rights case regarding smart meters in the amount of $117,500.[49]

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[47] https://stanfordhealthcare.org/medical-conditions/blood-heart-circulation/arrhythmia/causes/triggers.html

[48] *Donna Kinsey v. Virginia Electric and Power Company* Case: CL1400701-00

[49] *Malia "Kim" Bendis vs. The City of Naperville, Illinois, et al* Case: 1:15-cv-00720

55. William R. Metallo is suing the Orlando Utilities Commission in the U.S. District Court Middle District of Florida Orlando Division, invoking the Americans with Disabilities Act.[50]

56. Unfortunately, many of the lawsuits against utilities about smart meters, including their settlements, have been 'sanitized' from the Internet and cannot be found nor accessed online easily. What does that indicate regarding culpability and depriving public access to information about AMI Smart Meters and the legal culpabilities and liabilities of parties involved, e.g., smart meter installation companies; smart meter manufacturers, e.g., Itron and Landis+Gyr, who makes PECO's AMI *Flexnet* Smart Meters; and the lawsuit against the California Central Public Utility Commission regarding health and safety impacts of smart meters. Customers' health issues and legal problems for utility companies and states public utility commissions were an anomaly before AMI Smart Meters. Now, those problems occur in states where AMI Smart Meters have been retrofitted indicating non-thermal adverse health effects from microwave EMFs/RFs.

57. In western Pennsylvania according to ***TRIB Live***, the *Tribune-Review* newspaper of Western Pennsylvania/Pittsburgh Area, website dated September 12, 2013, published "Springdale family gets water back while **deal negotiated in 'smart meter' case.**" Attorney John Zagari of Pittsburgh filed an injunction in Allegheny County Court to get the family's water turned back on claiming the **borough was violating Cindee Zlacki's right to due process.**

58. "Zlacki said she is most concerned about the potential effects the smart meters' radio frequency emissions will have on her two epileptic sons. She fears the emissions will cause

[50] ***William R. Metallo v. Orlando Utilities Commission, et al*** Case: 6:14-cv-1975-Orl-40KRS

muscle spasms and subsequent seizures, particularly with one who spent 153 days in Children's Hospital of Pittsburgh last year because of a series of seizures."

59. Attorney Zagari said, "**If you want to act as a monopolistic power in this country, you need to provide your citizens with viable alternatives." "I'm not saying you can't implement a cost-saving program, but to force it upon everyone without exception is unconstitutional.**"

60. According to the *TRIB Live* online newspaper report, "An Allegheny County Court judge has ordered the borough to restore water to the family's Railroad Street residence while the Zlackis and borough officials work toward a resolution over Springdale's mandated "smart meter" system."[51]

61. All the above is germane to the specific issue at hand regarding *Frompovich v. PECO Energy Company* insofar as it provides important background information which formulates Frompovich's reasons and resolve for refusing an AMI Smart Meter, specifically EMFs/RFs and non-thermal radiation health effects regarding cancer(s) that may, or can, negatively impact Frompovich's immune system, health and overall wellbeing, since she is a breast cancer survivor going on six years, whereas medical and scientific research support and confirm cancer, including breast cancer, from EMFs/RFs.

62. Frompovich contends a **wired smart meter** is operationally different from a **non-wired, microwave technology-operating smart meter** due to AMI Smart Meter sharp RF

[51] http://triblive.com/neighborhoods/yourallekiskivalley/yourallekiskivalleymore/4687313-74/meters-smart-borough

spikes, which cannot be turned off, plus many operate on mesh networks. PECO states its *Flexnet* meter is not on a mesh network. Authenticity and certification of PECO's claims and statements as fact should be required from an independent third party licensed to certify smart meters and their operations proving PECO's *Flexnet* claim. Such **Certificate of Authenticity** should be required as part of the record in this case rather than accepted as hearsay from PECO's witnesses stating they "checked out" PECO's *Flexnet* meter.

63. On a mesh network, it's been found that 90% of the pulses are not customers' usage data but mesh network "chatter." Keep in mind that Frompovich and other individuals noted sharp RF spikes every 15 seconds coming from PECO's *Flexnet* meter, which would indicate it probably is operating on a network of some type and emitting more RFs than PECO experts claimed. Frompovich believes the PA PUC and this Court should require an independent EMF/RF assay with Frompovich present to establish the EMF/RF emissions from PECO's *Flexnet* AMI Smart Meter since there are variances between PECO's claims, Frompovich's findings and published literature for AMI Smart Meters.

64. EMFs/RFs and dirty electricity pollution pulsed every 15 seconds from PECO's *Flexnet* Smart Meters and were noted by Frompovich and two other concerned individuals using two different "Electrosmog-type meters" to survey Frompovich's neighbors' PECO *Flexnet* AMI Smart Meters. *Cf. Transcript pp. 76-78* EMF emissions were evident and registered up to 15 feet out or away from directly in front of the PECO *Flexnet* meter, which PECO and its experts claim are not valid readings, especially since Frompovich states the readings registered in unsafe zones on one meter every 15 seconds, as reported by Frompovich during hearing testimony.

65. Frompovich contends the facts surrounding the PECO *Flexnet* meter and its operational network and signals need to be verified by an independent third party licensed to

perform certification, otherwise PECO's expert witnesses' testimony regarding their *Flexnet* meter should be regarded as hearsay, and not **third-party reproducible and verifiable, which is the standard protocol for science-based science.**

66. High intensity RF pulses are similar to strobe lights which, in some people who are susceptible or reactive to them, can **trigger** seizures, headaches and dizziness—neurological effects. Furthermore, most utility-company-reported-low-RF-exposures are calculated by utilities using "**time averaging,**" which is misleading but can—and does—bring down total peak levels, which utilities can claim their smart meters emit. It needs to be ascertained whether **PECO or its experts used "time averaging" regarding the *Flexnet* meter statistics they reported during testimony.** That is a key criterion to establish in order to come to an equitable decision regarding non-thermal radiation emissions and EHS or IEI complaints and, in particular, with regard to EMF/RF triggers.

67. FCC guidelines state that consumers should not be subjected to fields around 600 microwatts per centimeter squared (μW/cm2) **for more than 30 minutes,** so what can customers expect health-wise when they are exposed to electric pollution (dirty electricity pulsed onto their home wiring) 24/7/365 traveling through house walls on copper wires. That exposure apparently precipitates for susceptible persons what amounts to EHS and IEI, i.e., non-thermal radiation precipitating adverse health effects, since **people are exposed more than 30 minutes a day in their homes where they live and sleep.** Has anyone calculated **ongoing cumulative effects**?

68. Scientifically, microwaves and non-ionizing radiation can travel through walls. Receiving cell phone calls inside your home is proof. Furthermore, gasoline stations post signs stating do not use a cell phone when filling up with gasoline. Apparently, RF fields can ignite

flammable liquids and their fumes through induction of currents. That, Frompovich contends, is further proof of what non-ionizing microwave radiation can do.

69. The AMI (Advanced Metering Infrastructure) Smart Meter contains a two-way **ZigBee radio transmitter,** which actually is part of a networking technology. Some ZigBee global operations are 2.4 GHz frequency band radio transmitters, while in the North and South Americas, the range is 915 Mhz (868 Mhz for Europe and 920 Mhz for Japan).

70. AMI Smart Meters communicate via ZigBee networking technology[52], therefore Frompovich questions PECO's claim for its *Flexnet* meter as not operating on a mesh-like network. The ZigBee transmitter works on a network with frequent RF output. Furthermore, PECO swapped out 186,000 Sensus AMI Smart Meters for the Landis+Gyr AMI Smart Meters on advice after having Underwriters Laboratories (UL) and two independent contractors examine the meters and render their reports. If, as PECO experts state, the UL certified its *Flexnet* meter, then the PA PUC has a civic and legal duty to require each PECO *Flexnet* AMI Smart Meter be retrofitted with a UL seal of approval as legal proof of safety to comply with the PA PUC's Mission Statement:

> **Mission Statement:** The Pennsylvania Public Utility Commission balances the needs of consumers and utilities; ***ensures safe and reliable utility service*** at reasonable rates; ***protects the public interest***; educates consumers to make independent and informed utility choices; furthers economic development; and fosters new technologies and competitive markets in an environmentally sound manner.[53]

71. However, for the record, Frompovich states she could find no information about PECO's *Flexnet* AMI Smart Meter emissions online. Apparently, PECO/Exelon have not posted such information online for consumers. If PECO's *Flexnet* AMI Smart Meter is significantly different and 'safer', as PECO experts contended during testimony, shouldn't that information be

[52] http://www.telegesis.com/about-us/zigbee-overview/
[53] PUC http://www.puc.state.pa.us/about_puc.aspx

made public knowledge and available to all via the Internet? The only online information about a *FlexNet* AMI Smart Meter is the *FlexNet* meter manufactured by Sensus.

72. ZigBee transmitters can emit EMF radiation in all directions by utilizing the microwave frequency of 2.4 GHz (global operations) and in *"Regional operation in the 915Mhz (Americas), 868Mhz (Europe) and 920 MHz (Japan)*[54]*"*. Frompovich respectfully points out on Page 246 (6-13) of the Transcript, PECO expert Dr. Christopher Davis stated in answer to Her Honor Judge Heep's identifying CD7,

> "Yes, Your Honor. These calculations for the AMI radio which contains the Zigbee, it includes the power from the Zigbee as well as the power from the FlexNet radio. It doesn't really add very much because the Zigbee is a much, much lower power radio than the FlexNet radio. It's only designed to transmit over a few meters to potentially in the future connect to smart devices in a home."

To which Judge Heep asks *cf. Transcript pg. 246 (16-17)* "Again, for my information, why are the FCC limits different?" Dr. Davis answered *cf. Transcript pg. 246 (18-21),*

> "Based on the standard setting bodies that have looked at exposures and they've looked at **how the body absorbs different frequencies**, they set the safety limits at different values for different frequencies."

73. Frompovich points out PECO's expert witness Dr. Davis admits the body absorbs different frequencies thereby validating Frompovich's health concerns (plus one of the reasons for her complaint before the PA PUC) about EMFs/RFs emanating from a PECO AMI *FlexNet* Smart Meter. Such frequencies correspond to what's called "non-thermal radiation." PECO experts deny there can be adverse health effects from it, something Frompovich wants to avoid in order to prevent any type of cancer recurrence, since cancer is a known adverse health effect from microwave radiation EMFs/RFs. Frompovich tried introducing exhibits regarding cancer

[54] http://www.zigbee.org/zigbee-for-developers/network-specifications/zigbeeip/

induced by EMFs/RFs/ELFs but those exhibits were objected to by PECO and not permitted to be entered into testimony.

74. However Frompovich, in arguing her case and as a point of medical scientific reference, introduces the **American Academy of Environmental Medicine's "Electromagnetic and Radiofrequency Fields Effect on Human Health"**[55] report where on page 2 it states:

> "Genotoxic effects from RF exposure, including studies on **non-thermal levels of exposure,** consistently and specifically show chromosomal instability, altered gene expression, gene mutations, DNA fragmentation and DNA structural breaks."

All those above effects can be or are cancer-causing effects.

In the first paragraph of the report, the AAEM states:

> "By the mid 1990's, it became clear that **patients were adversely affected by electromagnetic fields and becoming more electrically sensitive**. In the last five years with the advent of wireless devices, there has been a massive increase in radiofrequency (RF) exposure from wireless devices as well as reports of hypersensitivity and diseases related to electromagnetic field and RF exposure. **Multiple studies correlate RF exposure with diseases such as cancer,** neurological disease, reproductive disorders, immune dysfunction, and electromagnetic hypersensitivity."

75. During Frompovich's cross-examination of PECO's medical expert, Dr. Mark A. Israel, Dr. Israel said he was not familiar with what the American Academy of Environment Medicine was about even though he knew about others. *Cf. Transcript Pg. 284 (21-25)*: *"I've been a physician for over 40 years and I know most of the so-called American academies. I had not heard of this one."* That was Dr. Israel's remark regarding the AAEM six-page report Frompovich introduced into the hearing record as Exhibit "I".

[55] https://www.aaemonline.org/emf_rf_position.php

76. Frompovich, therefore, claims PECO's expert witness is not qualified to testify in her *specific* case as Dr. Israel's testimony is offered to skew published academic and independent EMF/RF non-thermal frequencies and adverse health effects research and IEI, including **cancerous pathology**.

77. For the record, The **American Academy of Environmental Medicine** is accredited to provide continuing medical education for physicians by the Accreditation Council for Continuing Medical Education (ACCME), 515 N. State Street, Suite 1801, Chicago, IL 60654; Tel(312) 527-9200.[56]

> Furthermore, The American Academy of Environmental Medicine was founded in 1965, and is an international association of physicians and other professionals interested in the clinical aspects of humans and their environment.
>
> The Academy is interested in expanding the knowledge of interactions between human individuals and their environment, as these may be demonstrated to be reflected in their total health. **The AAEM provides research and education in the recognition, treatment and prevention of illnesses induced by exposures to biological and chemical agents encountered in air, food and water.** [57]

78. Frompovich respectfully requests this Honorable Court and the PA PUC recognize the American Academy of Environmental Medicine as a legal medical association involved in continuing education for physicians and medical/health research whose information regarding **EMFs/RFs and cancer** should not be rejected, as PECO attorneys objected to during the hearing. Frompovich emphasizes **"Electromagnetic and Radiofrequency Fields Effect on Human Health"** for the record in this Brief, which she introduced during testimony as Exhibit "I", and as *Brief Exhibit No. 2.*

[56] https://www.aaemonline.org/aboutus.php
[57] Ibid.

79. Frompovich states the AAEM report is germane to the health issues at hand since microwave technology science is at loggerheads—even possible outright consensus denial exists in view of the plethora of non-thermal radiation adverse health effects reported for years, including cancers, in the scientific literature **[70% harmful non-industry studies vs. 32% harmful industry studies,** *cf. Complainant Exhibit No. 2*]—regarding the effects of microwave EMFs/RFs/ELFs non-ionizing radiation. Consensus denial was acknowledged by Dr. Israel's answer to Attorney Watson Transcript Page 270 (11-19):

> "Well, in my experience in science, when you get inconsistent results, it usually is because the effect size is so small that one is really looking at noise in a very complicated system where you can't control every variable, so its epidemiology you really don't know that one population is exactly the same as the other population, or in an animal experiment, as hard as we try, there's always some variability in every single specimen. **And so almost always, inconsistency means that there is not an effect."**

80. According to Andrew A. Marino, Ph.D., J.D. and Lawrence E. Marino, J.D.,

"The negative inference becomes a nullity, however, when even one animal study is positive. [....] "One valid affirmative study may destroy a plausible inference that was based on numerous valid negative observations."[58] *Cf. Complainant Exhibit No. 2; Transcript pg. 232 (11-15)*

81. Frompovich argues inconsistency and no effect are what microwave technology industries, and PECO experts in this case, hang their hats on as the 'saving grace science' in order to promote respective **industry-versions of EMF/RF/ELF science**.

82. Moreover, Frompovich tried introducing during testimony the **disparities existing in radiofrequency research** as **Exhibit O,** two pie charts indicating that in **NON-Industry Studies**, 70% found HARMFUL effects and 30% found no effects; whereas in **INDUSTRY-studies, 32% found HARMFUL effects** and 68% found no effects. Those data were compiled

[58] A.A. Marino, L.E. Marino. 1995. The Scientific Basis of Causality in Toxic Tort Cases. *Dayton Law Review*, Vol. 21, pp.1-62 (Pg. 8)

by Dr. Henry Lai, University of Washington[59], Professor Emeritus—Department of Bioengineering.

83. Dr. Lai's work included the "**biological effects of non-ionizing electromagnetic fields (from extremely-low frequency to radiofrequency) and their possible medical applications.**

Development of artemisinins[60] for **cancer treatment**."[61]

84. The very fact **Industry-studies found 32% harmful effects**—almost one-third of studies—indicate **there is scientific proof of harmful effects.** Therefore, Frompovich's contention is not *argumentum ad populum* and should not be disregarded as unscientific, as PECO's attorneys and experts tried convincing this Honorable Court.

85. To further document **Frompovich's breast cancer and EMF/RF concerns/issues,** Ph.D. researchers Claude Monnet (Radiology) and Pierre le Ruz (Physiology) published "**The Microwave Syndrome,**" *cf. Complainant Exhibit K* wherein they list "**Cancerous pathology**: leukaemia, glutathione and melanoma, **breast cancer**." [62]

On page 266 (23-25) PECO Attorney Tom Watson asked PECO medical expert Dr. Israel the following:

> "Excuse me. You said found no association. Between what and what?"
> **Dr. Israel A. "Breast cancer and radiofrequency field exposure."**
>
> On page 267 (10-21) PECO Attorney Mr. Watson continues questioning Dr. Israel as follows:
>
> Q. "Just to make sure I understand there, **no studies reporting that exposure to radiofrequency fields increased the risk of a recurrence of breast cancer**?"
> A. "That's correct."

[59] https://depts.washington.edu/bioe/portfolio-items/henry-lai/
[60] Artemisinins : derived from extracts of sweet wormwood
[61] *Cf.* 59
[62] http://stralingsarmvlaanderen.org/resources/MicrowaveSyndrome012007Uk.pdf Pg. 3

Q. "I saw a statement somewhere in the papers, documents that were furnished in this case that radiofrequency fields from a PECO smart meter will medically interfere with Mrs. Frompovich's ability to heal from breast cancer and live cancer-free. Do you agree with that statement?"
A. "No. The scientific studies in this area do not support that statement."

Additionally, Monnet and le Ruz say:

> **"In accordance with the universal laws of physics, all scientific studies carried out in the world show that further to radiation's from hyper frequency or microwaves either thermal effects or non-thermal specific effects can be observed**. The specific effects and the microwave syndrome (or hyper frequency syndrome) were first described as early as 1960 by Russian scientists. Later on in 1998, this will be confirmed in an American peer reviewed paper (NCBI) that will explicit the link between this syndrome and exposure to pulsed hyper frequencies."[63]

86. In the Transcript page 268 (13-15), PECO Attorney Watson asks PECO medical expert Dr. Israel, "Have you given consideration to the question about whether **exposure to radiofrequency fields impair the immune system**?" To which Dr. Israel answered on page 269 (15-22),

> "In humans, there actually were many fewer studies, but again, the results were contradictory. What studies there were really looked at individual components of the immune system which is a very complicated network of hundreds of components. There never was a sufficient study to really look at the effect on overall immune function, but the studies that were available, again, were contradictory."

87. ***EMFWise* Health Effects of Wireless Radiation** states:

> **Immune System Dysfunctions and Chronic Diseases**
>
> Unlike other particles and pathogens, **microwaves can penetrate directly into the body**. **This is a problem for the immune system** which relies a lot on skin as a barrier against pathogens. Some of the possible consequences found from microwave radiation include: **Morphological alterations of immune cells**; **Changes in lymphocytes dependent on the carrier frequency**; **Reduced T lymphocyte count**; and Hypersensitivity manifesting as autoimmunity."[64]

The above information contradicts PECO medical expert Dr. Israel's testimony.

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[63] Ibid. Pg. 1 (2.)
[64] http://www.emfwise.com/science_details.php#cancer

In that very same website[65] under "**Genotoxic Effects and Cancer,**" this:

> **Scientific Evidence**
>
> **One of the first studies to show DNA breaks from microwaves was conducted by Henry Lai and Narendra Singh of the University of Washington.**[8] ***Despite the industry's attempts to attack this study, this finding was later confirmed by the 7-nation European REFLEX project and a study by the University of Vienna*. There are now in total at least 11 studies showing DNA breaks.**[9] **In addition to studies on DNA breaks, there are also now studies showing effects upon gene expression.**[10] Not all studies found significant increases in DNA damage, but it's important to note that not all cell types may be equally sensitive. A paper by Phillips, Singh, and Lai further notes that the comet assay method is very sensitive and that some researchers with little prior experience made specific methodological errors, or developed versions with different detection sensitivities.[11]
>
> 8 Harrill, Rob, "Wake-up Call" http://www.washington.edu/alumni/columns/march05/wakeupcall01.html http://www.bioinitiative.org/ section 6
>
> 9 http://www.microwavenews.com , 9/3 entry
>
> 10 PMID 16511873, PMID 16107253, and http://www.bioinitiative.org/, section 5
>
> 11http://download.journals.elsevierhealth.com/pdfs/journals/0928-4680/PIIS0928468009000066.pdf "Electromagnetic fields and DNA damage"

88. Frompovich points out the dogmatically-held **disparities in microwave science regarding non-thermal radiation adverse health effects (cancer, in particular) that has direct and even negative impacts upon her and all cancer patients,** who are or will be adversely impacted by AMI Smart Meter non-thermal radiation and EHS or IEI, which really is the principal issue involved with any AMI Smart Meter for Frompovich in Pennsylvania.

89. During PECO Attorney Watson's questioning Dr. Israel, Dr. Israel stated, *Cf. Transcript Pg. 290 (22-25):*

> Number two, non-thermal health effects have been widely studied but are still theoretical and have not been recognized by experts as a basis for changing regulatory exposure limits.

[65] Ibid.

90. Frompovich further offers if heat produces recognized thermal effects, while non-thermal health effects have been studied widely **with 32% of industry studies reporting them, then there is scientific consensus** about both issues, especially non-thermal adverse health effects.

91. To further indicate the unreliable testimony from PECO's medical expert, Mark A. Israel, M.D., Frompovich brings attention to the Transcript wherein Dr. Israel disqualifies himself.

> Page 324 (3-10)
>
> Judge Heep Q.: You testified earlier about your background and you said that you conduct experiments and you work with other people. Have you ever worked with physicists on these issues?
>
> Dr. Israel A.: Not on these issues, but I have worked with physicists.
>
> Judge Heep Q.: But not directly regarding EMFs?
>
> Dr. Israel A.: No.

Based upon PECO's medical expert's own words, Dr. Israel's testimony places doubt regarding his expertise regarding EMFs/RFs and cancer.

92. Frompovich argues that scientifically acknowledging non-thermal health effects would mandate too many changes in the microwave industry, which would not be cost effective[66], while continuing to put the public's health and wellbeing at risk, thereby accruing culpability legal issues for those industries. Such scientific mischief is reminiscent of 1992's Senate Committee on Labor and Human Resources findings of numerous quality problems in the

[66] http://www.magdahavas.com/wordpress/wp-content/uploads/2011/02/BIOLOGICAL_EFFECTS_OF_ELECTROMAGNETIC_RADIATION-RADIOWAVES_AND_MICROWAVES-EURASIAN_COMMUNIST_COUNTRIES.pdf (Pg.24)

field of mammography and its equipment, while women for years were advised to get annual mammograms. Or another classic example of scientific mischief occurred in the 1940s and '50s when most doctors preferred and smoked Camels cigarettes[67]. How many doctors today would subscribe to smoking, especially since "tobacco science" has become the pejorative genre for faulty and misleading science?

93. David O. Carpenter, **MD,** co-editor of the ***BioInitiative 2012 Report***, says: *"There is now much more evidence of risks to health affecting billions of people world-wide. The status quo is not acceptable in light of the evidence for harm."*

94. In the ***BioInitiative 2012 Report,***[68] a 1557-page report, which is impossible to include in this Brief, about **1800 new studies regarding low-intensity electromagnetic fields and wireless technology (radiofrequency radiation including microwave radiation) were discussed.** In the Preface to that report, it states:

> The great strength of the BioInitiative Report (www.bioinitiative.org) is that ***it has been done independent of governments, existing bodies and industry professional societies that have clung to old standards.*** Precisely because of this, the BioInitiative Report presents **a solid scientific and public health policy assessment that is evidence-based.**[69]

95. Frompovich now points to PECO expert **Dr. Christopher Davis, Ph.D.** testimony. Dr. Davis is as a **professor of electrical and computer engineering at the University of Maryland,** and could not answer Frompovich's questions about electric meters surge arresters.

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[67] http://tobacco.stanford.edu/tobacco_main/images.php?token2=fm_st001.php&token1=fm_img0002.php&theme_file=fm_mt001.php&theme_name=Doctors%20Smoking&subtheme_name=More%20Doctors%20Smoke%20Camels

[68] http://bioinitiative.info/bioInitiativeReport2012.pdf

[69] **Ibid. Pg. 6**

Page 241 (20-25)
Frompovich Q.: Those surge arresters have been taken off and not built into AMI smart meters; is that correct?

Davis A.: I don't know.

Frompovich Q.: Is that the case for PECO's AMI smart meters?

Davis A.: I don't know.

Page 241 (25) and Page 242 (1-14)
Frompovich Q.: Why don't you, if you were the one who certified the emissions and so on and so forth.

Davis A.: I was asked to evaluate the emissions and the power densities that result for people living in homes near these meters. I wasn't asked to look into the design of the meters specifically and whether they have surge protection or whether it could report to the fire brigade or anything else like that.

Frompovich Q.: Thank you. I have to set it up to ask the question. Consequently, if surges passing through an AMI smart meter go into homes, can they damage appliances?

Davis A.: An electric surge, if it gets to the wrong kind of appliance, can damage it. I can't speak to whether the AMI meters allow surges to come through. Again, that is a question I think you should have asked of Mr. Pritchard.

Dr. Davis's answers seem uncannily "out of sorts" for an electrical engineering professor, especially one who has been brought into court as an "expert."

96. Another example of Dr. Davis's seemingly lack of expertise is:

Page 235 (15-23)

Frompovich Q.: How come the AMI meter that you sort of scoped out for PECO has so much less electromagnetic emissions than the AMI meters that other scientists say put out? What is the specs, what are the specs, what's the difference, and how did you come by that certification or whatever you did for PECO?

Davis A.: I don't know of any other scientists or engineers who have done these calculations who've disagree with me.

Page 235 (24-25) and Page 236 (1-7)

> Frompovich Q.: That's not what I asked. I asked, how did you do them, or can you – I have the specs for them? There has to be specifications somewhere.
>
> Davis A.: I know the power that comes from a PECO AMI meter, for how long it turns on, how often it turn on, and I use the inverse square law to figure out what the power density is in milliwatts per square centimeter at a distance from the meter. This is a very standard scientific calculation that could be done by any engineer.

97. Frompovich respectfully points out Dr. Davis "certification" of PECO's *FlexNet* AMI Smart Meter electromagnetic emissions was performed as **a *human scientific calculation*** using the inverse square law to figure his answer(s). Frompovich contends with today's technological advancements, there has to be **calibration equipment rather than human calculation to substantiate PECO's meter claims.** Independent third party duplication and validation [*a rudiment of science*] of PECO's *FlexNet* Smart Meter claims are necessary in view of so much variance in published scientific literature regarding ZigBee transmitters and AMI Smart Meters, including nothing could be found online by Frompovich regarding PECO's *FlexNet* AMI Smart Meter's specifications, emissions, etc.

98. With so much **scientific disparity** regarding microwave technology thermal and non-thermal radiation effects—health and otherwise, plus PECO claiming its *FlexNet* AMI Smart Meter is 'so much safer' than other AMI Smart Meters, shouldn't PECO's claims be verifiable by independent third parties other than by paid expert witnesses.

99. **As Frompovich has stated elsewhere in this Brief, a defining issue in the AMI Smart Meter issues in Pennsylvania is the scientific disparity denying non-thermal radiation adverse health effects, one of which is cancer and all its numerous manifestations, including breast cancer.**

100. PECO and the PA PUC (by default) contend the exposure criteria for SAR (specific absorption rate) for EMFs/RFs are set by the FCC (Federal Communications Commission). The FCC does not have the expertise or the capabilities to determine the safety of electromagnetic fields. **FCC** stated "Because **the Commission does not claim expertise as a *de facto* health agency,** it necessarily considers the views of federal health and safety agencies and institutes that continue to address RF exposure issues in formulating such judgments" in the Federal Register Vol. 78, No. 107 / Tuesday, June 4, 2013 / Proposed Rules[70]. Basically, **the FCC takes no responsibility for the science.** It depends upon private and semi-private organizations and industrial professional societies, e.g., **IEEE, the American National Standards Institute (ANSI), the National Council of Radiation Protection (NCRP) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP)** for input that counters academic and independent EMF/RF research for years, i.e., **32 % harmful effects versus 70% harmful effects found by non-industry studies.** *Cf. Complainant Exhibit No. 2; Transcript Pg. 232*

101. According to Glen Pritchard, PECO employee and expert witness, upon cross-examination by Frompovich stated *cf. Transcript pg. 146 (8-12):*

Frompovich Q.: I have some questions. Mr. Pritchard, first of all who funds EPRI?

Pritchard A.: That is funded by member utilities.

Frompovich Q.: Really?

Pritchard A.: Yes.

PECO and its experts presented and quoted NCRP and ICNIRP, industrial professional societies, EMF/RF views during testimony as scientific fact. In scientific reality, **those**

[70] https://www.gpo.gov/fdsys/pkg/FR-2013-06-04/pdf/2013-12713.pdf Pp. 7-8

organizations data are being challenged with conflicts of interest and making misleading statements in published papers. Those organizations scientific accuracy is questioned. Frompovich now brings **ICNIRP** to the attention of this Honorable Court and the PA PUC.

102. In the recently (December 2016) ***Reviews on Environmental Health—De Gruyter*** published article "Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation," Sarah J. Starkey, Independent Neuroscience and Environmental Health Research, London, UK, describes ***"incorrect and misleading statements from within the* [AGNIR 2016]** ***report, omissions and conflict of interests, which make it unsuitable for health risk assessment. The executive summary and overall conclusions did not accurately reflect the scientific evidence available. Independence is needed from the International Commission of Non-Ionizing Radiation (ICNIRP), the group that set the exposure guidelines being assessed.***"[71]

103. In the ***Introduction***, Starkey states:

> "The latest AGNIR review has also been relied upon by health protection agencies around the world, including the Australian Radiation Protection and Nuclear Safety Agency and Health Canada.
>
> "The majority of the global population absorb RF radiation on a daily basis from smartphones, tablet computers, body-worn devices, Wi-Fi and Bluetooth transmitters, cordless phones, base stations, **wireless utility meters** and other transmitters." (Pg. 493)

104. In that *Introduction* it states the United Kingdom Public Health England "commission[s] scientific reviews by the Advisory Group on Non-ionising Radiation (AGNIR) to assess the safety of RF fields." PECO's expert medical witness Dr. Mark A. Israel testified *cf. Transcript 280(10-18)*:

[71] https://www.degruyter.com/view/j/reveh.2016.31.issue-4/reveh-2016-0060/reveh-2016-0060.xml?format=INT (Pg. 493)

Israel A.: Right. So I'm going to read to you a statement from the United Kingdom Health Protection Agency issued in a 2012 report, and I quote: *"A large body of experimental evidence now exists concerning the impact of RF fields on self-reported symptoms. When taken together, the experimental evidence suggests that short-term exposure to RF fields below guideline levels does not cause acute symptoms either in the general public or in people who report being sensitive to electromagnetic fields."*

105. It would seem Dr. Israel's quotation from the UKHPA 2012 report came from information generated and disseminated by AGNIR, the very advisory group implicated in "incorrect and misleading statements" within its 2016 report.[72]

106. Under ***Conflicts of interest,*** Starkey points out:

"At the time of writing the report, the chairman of AGNIR was also chair of the **ICNIRP** standing committee on epidemiology. Currently, six members of AGNIR and three members of PHE [Public Health England] or its parent organisation, the Department of Health (DH), are or have been part of **ICNIRP**." [....] **"How can AGNIR report that the scientific literature contains evidence of harmful effects below the current guidelines when several of them are responsible for those guidelines?** PHE provide the official advice on the safety of wireless signals within the UK, but having members in **ICNIRP** introduces a conflict of interest which could prevent them from acknowledging adverse effects below ICNIRP guidelines." (Pp. 493-94)

107. Under ***Scientific accuracy,*** this:

"(a) **Studies were omitted**, included in other sections but without any conclusions, or conclusions left out; (b) evidence was dismissed and ignored in conclusions; (c) there were incorrect statements. **Terms such as 'convincing' or 'consistent' were used to imply that there was no evidence.**" (Pg. 494)

"No evidence" was something PECO medical expert Dr. Mark A. Israel stated several times in his testimony regarding science research on EMFs, non-thermal adverse effects and cancer.

108. ***"Studies omitted, included in other sections but without any conclusions, or conclusions left out"***

Referring to ROS [reactive oxygen species]: "By only including a few of the available studies, not referring to many scattered throughout the report and **not mentioning ROS or oxidative stress in any conclusions or the executive summary**, this important area of **research was misrepresented**. **Oxidative stress is a toxic state which can lead to cellular DNA, RNA, protein or lipid damage** (7,8) **is a major cause of cancer** (7), as well as being implicated in many reproductive, central nervous system, cardiovascular, immune and metabolic disorders. (Pg. 495)

[72] Ibid.

The above is specific scientific evidence about Frompovich's health concerns about being exposed to PECO's *FlexNet* AMI Smart Meter EMFs/RFs, as she is a breast cancer survivor.

> "The evidence on effects on male subfertility is very limited, and allows no conclusions." (Pg. 495)
>
> **"ICNIRP only accept thermal effects of RF fields and focus on average energy absorbed."** (Pg. 495)

109. ICNIRP has stated its members are independent of vested, commercial interests. However, **several ICNIRP members**, e.g., Dr. Alexander Lerchl, **have been accused of conflicts of interests,** the most famous being Anders Ahlborn, Professor of Epidemiology at the Karolinska Institute and former consultant to the tobacco industry. **Professor Ahlborn was forced to resign as a member of the WHO's IARC working group on radiofrequencies**[73]. Ahlborn was 'outed' that he was the director of the consulting firm Gunnar Ahlborn AB, founded by his brother. **That consulting firm served telecom businesses and industry.**

> "Many of the longer-term observational studies described significant associations of RF exposures with symptoms, albeit with limitations in study designs: '*while some, though by no means all, of the studies reviewed above appear to suggest an association between mobile phone use and symptoms...* ",[page 245 (2)] followed by *"almost all of the studies share a fundamental methodological problem which makes it difficult to draw any firm conclusions from them: these studies relied upon the participants' own descriptions of their mobile phone usage as the exposure variable for their analysis and on self-description of symptoms while knowing exposure status'(2).* **Longer-term studies on symptoms were omitted from the executive summary.**" (Pg. 496)

110. **The above paragraph independently supports PECO medical expert witness Dr. Israel's statements during testimony regarding evidence and conclusions, as to no scientific evidence,** apparently due to scientific mischief, which Starkey's exposé indicates.

111. "No mention was made of the World Health Organization (WHO) International

[73] http://www.monanilsson.se/document/AhlbomConflictsIARCMay23.pdf

Agency for Research on Cancer (IARC) classification of RF fields as **a possible human carcinogen in 2011, which was based on limited evidence supporting carcinogenicity below ICNIRP guideline values.**(32)" (Pg. 496)

> "By the end of the report, the conclusions on cellular studies had incorrectly become ***'There are now several hundred studies in the published literature that have looked for effects on isolated cells or their components when exposed to RF fields. None has provided robust evidence for and effect.***[page 318 (2)]" (Pg. 497)

Again, that is another reiteration as to how no scientific evidence is found and which PECO, its attorneys and medical expert rely upon as factual.

112. There are numerous more examples Frompovich could cite from the Starkey paper, but in the interest of trying to keep this Brief as brief as possible but scientifically accurate regarding scientific mischief, Frompovich proceeds to that article's ***Conclusions*** for further examples:

> **"The denial of the existence of adverse effects of RF fields below ICNIRP guidelines in the AGNIR report conclusions is not supported by the scientific evidence."** [....]
>
> **"The involvement of ICNIRP scientists in the misleading report calls into question the basis and validity of the international exposure guidelines.** To protect public health, we need accurate official assessments of whether there are adverse effects of RF signals below current international ICNIRP guidelines, independent of the group who set the guidelines.
>
> **"The anticipated WHO Environmental Health Criteria Monograph on Radiofrequency Fields, due in 2017, is being prepared by a core group and additional experts with 50% of those named, being, or having been, members of AGNIR or ICNIRP.** (Table2) [....]
>
> **"Independence from ICNIRP is necessary to remove the conflict of interest when effects below ICNIRP exposure guidelines are being assessed."** [....]
>
> "Individuals and organisations who/that have made decisions about the often compulsory exposures of others to wireless RF communication signals may be unaware of the physical harm that they may have caused, and may still be causing, because they have not been accurately informed of the risks." [....] **"To prevent further possible harm,**

restrictions on exposures are required, particularly for children, pregnant women and individuals with medical conditions." (Pg. 499)

"PHE and AGNIR had a responsibility to provide accurate information about the safety of RF fields. Unfortunately, **the report suffered from an incorrect and misleading executive summary and overall conclusions, inaccurate statements, omissions and conflict of interest. Public health and the well-being of other species in the natural world cannot be protected when evidence of harm, no matter how inconvenient, is covered up.**" (Pp. 499-500)

113. The above-cited paper has 99 References, some of which were included to show **corrupted science articles** which appear in the scientific literature. Frompovich includes that 11-page report in this Brief as *Brief Exhibit No. 3 Inaccurate official assessment of radiofrequency safety by the Advisory group on Non-ionising Radiation.*

114. The above brings to mind three current headline consumer safety issues related to misinformation and/or fraudulent information perpetrated upon unknowing consumers. 1) The **Takata air bag defect** initially emerged in 2001 when Isuzu recalled vehicles with airbag problems. Now the Takata air bag problem affects 69 million recalled cars. Takata's fine: $1 Billion with extradition of three Japanese Takata corporate officers to the USA for prosecution. 2) **Volkswagen and Fiat-Chrysler auto emissions pollution software systems** were set to deactivate emissions during USA emissions testing and give false emission readings indicating vehicles passed the test or were within legal limits. Probable fines: $20 Billion. 3) **Marine Corps Base Camp Lejeune potable water contamination** from August 1, 1953 to December 31, 1987 has harmed hundreds of thousands of veterans and their families from being exposed to toxins in household drinking water the base supplied. That tainted/poisoned water can cause 8 diseases: Adult leukemia, aplastic anemia, bladder cancer, kidney cancer, liver cancer, multiple myeloma, non-Hodgkin's lymphoma and Parkinson's disease. The United States will pay $2.2 Billion in disability compensations. An estimated 900,000 service members potentially were

exposed to the tainted water. What will happen to consumers when microwave radiation EMFs/RFs/ELFs finally are recognized for the health problems they are contributing to from non-thermal radiation emissions/exposures, since the science is there documenting them (32% confirming industry studies), but they still are being denied by vested interests.

115. Further indication of the **conflicts of interest and ICNIRP's questionable EMF/RF science** were addressed in the paper "**Radiofrequency/Microwave Radiation and the International Agency for Research on Cancer (IARC), The problem of conflict of interest & commercial influence in WHO agencies and the need for public interest representation,**" specifically on pages 14 and 15 under "***ICNIRP increases its ELF EMF guideline exposure limits and ignores science***"[74]. PECO's experts citing ICNIRP's data as valid science must be questioned as to validity and industry conflicts of interest.

116. **Utility customers with medical conditions, including those who are electromagnetically sensitive, medically known as IEI or EHS, and those covered under the three prongs of the ADAAA are impacted negatively by omissions, conflicts of interest and other scientific mischief regarding microwave EMF/RF/ELF non-ionizing radiation non-thermal health effects promulgated by industrial professional societies.**

117. When scientific mischief occurs in EMF/RF/ELF science through misrepresentations, omissions, inaccurate statements and conflicts of interest, it results in causing suffering for electromagnetically sensitive individuals and health concerns like those of Frompovich, a breast cancer survivor, who has been tracking microwave industry science literature.

[74] www.emfacts.com/download/IARC_2011_IARC_May_5_FINAL.pdf Pp. 14-15

118. However, more than anything, conflict of interest and misrepresentations of science validate the necessity for the PA PUC and the Pennsylvania Legislature to become current on EMF/RF/ELF science, non-thermal radiation and its adverse health effects regarding cancers and other diseases/conditions in order to comply with transparency issues, correct the problems, and provide safe, affordable electricity to Pennsylvania consumers.

119. Frompovich points out vested-interest microwave and AMI Smart Meter science is following the same singular course the tobacco industry took to protect its interests and marketability in denying cancer's association with tobacco use.

120. Frompovich, whose professional life has been devoted to and steeped in Nutrition and Holistic Health Sciences, its research and publications, plus her 40-year-long researching medical literature and writing [a journalist for numerous media] about the negative impacts of technology and man-made chemicals on human health, has allowed her to follow medical and scientific research. Previously, the tobacco industry compromised human health. Currently, the microwave industries and their industrial professional societies similarly disavow non-thermal adverse health effects, especially cancer. EHS or IEI patients, persons with disabilities covered under the ADAAA, pregnant women, fetuses and growing children are most at risk from microwave technology EMFs/RFs/ELFs and non-thermal radiation.

121. Finally, at this point in Frompovich's argument regarding the reasons for her refusal to be exposed to non-thermal radiation effects from PECO's or any AMI Smart Meters, she introduces the **U.S. Department of Labor's Office of Disability Employment Policy *funded* the Job Accommodation Network (JAN),** Morgantown, W. Virginia, **report "Job**

Accommodations for People with Electrical Sensitivity"[75] wherein on page 2 of that document, the following appears:

> "The National Institute for Occupational Safety and Health (NIOSH) and the Centers for Disease Control and Prevention (CDC) have published guidelines for 'safe' levels of human exposure in a publication called, Manual for Measuring Occupational Electric and Magnetic Field Exposures. However, **the nature of electromagnetic sensitivity is such that even levels that are deemed safe for the general public can cause trigger symptoms** for individuals who are hypersensitive. **Individuals affected by electromagnetic sensitivity experience symptoms at far lower levels and therefore may need accommodations in the workplace beyond the safe levels of exposure indicated in the manual."**

122. Clearly, electric and magnetic fields are recognized in a **federal-agency-funded report** as causing health harms with special accommodations recommended, as listed on page 3 of the JAN report. Special accommodations are needed in the work place, plus presented for employers' considerations regarding EHS or IEI individuals. That's another confirmation of non-thermal effects, plus reinforcement for Frompovich's rightful concerns about EMFs/RFs, cancer and "**triggers**," including her freedom from being exposed to non-thermal radiations originating and emanating from PECO's or any utility company's AMI Smart Meter(s). Frompovich includes the JAN report as part of this Brief as *Brief Exhibit No.4 Job Accommodations for People with Electrical Sensitivity.*

123. Effective January 1, 2017, a new law in France[76] obliges work places (companies) with 50 or more employees to negotiate with employees about their rights to switch off digital devices and to ignore their smartphones. Overuse of digital devices or what's called "always on work culture" has led to complaints about burnout, sleeplessness, as well as relationship problems. There are an estimated 70,000 electromagnetic hypersensitive (EHS or IEI)

[75] https://askjan.org/media/caps/employmentelectricalEAP.doc

[76] https://www.franceinter.fr/societe/les-entreprises-vont-devoir-proteger-les-salaries-des-ondes-electromagnetiques

individuals in France. That is yet another indication of the recognition of EHS and non-thermal adverse health effects.

124. Overexposure or constant exposure from multiple EMF/RF/ELF sources [AMI Smart meters, Wi-Fi, Smartphones, cell phones, routers, etc.] in today's "smart" technology age, especially those which cannot be controlled (turned off) by electromagnetic hypersensitive persons, have not been calculated or factored for "**cumulative effects**" from exposures to/from various media: EMF/RF/ELF non-ionizing microwave energy waves (thermal and non-thermal) emitted from digital devices. EMF cumulative effects need to be factored into EHS or IEI issues regarding AMI Smart Meters in Pennsylvania and should have been performed before any rollout of what amounts to an experiment of massive proportions. Furthermore, the PA PUC should be undertaking its own independent survey of Complainants' AMI Smart Meters thermal and non-thermal outputs by utilizing state-of-the-art "Electrosmog" measuring devices to confirm culpability and legal liability for the Commonwealth from the PA PUC-mandated EMFs/RFs/ELFs compromising consumers and making them sick.

125. Utility customer Frompovich should not be deprived of her right(s) to exercise **preventive health measures** relative to EHS, IEI, and exposure to EMFs/RFs/ELFs over which she has no direct control to avoid non-ionizing radiation emissions, e.g., AMI Smart Meters pulses from utility companies coming over her home's copper electrical wires. Allopathic medicine and Holistic Healthcare (CAM) promote "preventive health care"[77] (measures taken for disease prevention, i.e., appropriate screenings). However, Frompovich, a former holistic health professional and current consumer health researcher and writer/journalist, knows the most

[77] https://www.cdc.gov/healthcommunication/toolstemplates/entertainmented/tips/preventivehealth.html

effective method of preventive health care is monitoring and revising lifestyle; avoiding triggers, chemicals, and other sources negatively impacting body chemistry, neurology, DNA fragmentation and DNA structural breaks, which microwaves and AMI Smart Meters non-thermal radiation waves impact adversely.

VI. PROPOSED FINDING OF THE FACTS

126. Complainant Frompovich is a breast-cancer patient survivor since July 24, 2011. *Cf. Transcript page 57 (1-20)*

127. Complainant Frompovich is a retired complementary healthcare professional and an active consumer health researcher and journalist since the late 1970s, which enables her to make educated decisions regarding her health, treatment and ability to maintain wellness.

128. Complainant Frompovich invokes the Americans with Disabilities Act Amendments Act, the U.S. Constitution and the Pennsylvania Constitution rights to self-determination in her case before this Honorable Court.

129. Complainant Frompovich introduced at court science papers and other documentation indicating EMFs/RFs/ELFs emanating from microwaves produce non-thermal adverse health effects, including cancers and cancer of the breast. Frompovich tried introducing a compendium of almost 240 scientific documented studies relative to that, but PECO attorneys objected and those studies were not permitted into the testimony.

130. Complainant Frompovich states Act 129 (2008) implementation regulations as formulated by the PA PUC's *"beliefs"* **are at variance with HB2200 Legislative History** (*cf. Brief Exhibit No. 5*) as published in *PA House Journal* February 11, 2008 (pp. 386-403) and *PA Senate Journal* October 8, 2008 (pp. 2626-2631) wherein PA State Senator Fumo stated in the published record October 8, 2008, "In addition, **we did not mandate smart meters, but we made them optional.** We did say in new construction, where they really are practical, they will be put in."

131. Based upon the above, federal law applies and must be adhered to by entities [states and businesses] receiving federal grants or funding. Both Pennsylvania and PECO received federal funds and must comply with federal law, e.g., ADAAA. Therefore, Frompovich should not be required to accept a PECO *FlexNet* Smart Meter on to her electric service. Two principals at law prevail: 1) the ADAAA and 2) the PA PUC's overstepping its administrative agency powers on implementation rules and regulations for smart meters when the PA legislature made smart meters optional as published in PA *House* and *Senate Journals*. That impacts and counters/negates the PA PUC Act 129 implementation regulations as invalid and also brings into question the Regulatory Review Process in Pennsylvania.

132. PECO medical expert, Dr. Mark A. Israel, M.D., validated Frompovich's position regarding EHS or IEI—"idiopathic environmental intolerance," as he called it. **Dr. Israel stated physicians use the term IEI to include EMF electromagnetic hypersensitivity intolerance.** *Cf. Testimony pg. 278 (14-18); pg. 278 (25); pg. 272 (14-16); pg. 274 (8-9); pg. 274 (10-12)*

133. Frompovich introduced Exhibit K ("The Microwave Syndrome") into testimony wherein is listed the category **"Cancerous pathology**: leukaemia, glutathione and melanoma,

breast cancer. PECO medical expert Dr. Israel denied breast cancer and radiofrequency field exposure. *Cf. Transcript pg. 266 (23-25); pg. 267 (10-21)*

134. PECO medical expert Dr. Israel answered there were contradictory studies regarding exposure to radiofrequency fields impairing the immune system. *Cf. Transcript pg. 268 (13-15); pg. 269 (15-22)* Frompovich introduces **EMFWise Health Effects of Wireless Radiation**[78] statements regarding "Immune System Dysfunctions and Chronic Disease"[79] which include **Morphological alterations of immune cells**: Changes in lymphocytes dependent on the carrier frequency; Reduced T lymphocyte count and Hypersensitivity manifesting as autoimmunity. Also, "Genotoxic Effects and **Cancer**" where under Scientific Evidence, it discusses DNA breaks from microwaves and there are 11 studies showing DNA breaks, which lead to cancer. Furthermore, *"Despite the industry's attempts to attack this study, this finding was later confirmed by the 7-nation European REFLEX project and a study by the University of Vienna"* "Microwave RF Interacts with Molecular Structures"[80] select excerpts are listed below:

> The molecules in our bodies vary in size and total electric charge.
> These molecular structures of our body resonate with fluctuating electromagnetic fields.
> There are thousands of enzymes and other molecules in the human body.
> Each has its own mass, charge, and resonant frequency.
> This means that different electromagnetic frequencies will resonate with different molecules. Which means that the biological effects of EMF on molecular physiology are probably much more complex than is generally assumed to be the case.
> Ionizing radiation from the high energy end of the electromagnetic spectrum can directly break DNA molecular bonds, causing mutations.
> But photons of microwave RF do not have enough energy to directly break covalent molecular bonds.
> Industry advocates often make the statement that since RF cannot break molecular bonds, there is no way that it can cause cancer.

[78] http://www.emfwise.com/science_details.php
[79] http://www.emfwise.com/science_details.php#immune
[80] https://ecfsapi.fcc.gov/file/7520940906.pdf

> Such statements sound like good physics. But they reflect a poor understanding of biology.
> Tobacco can cause cancer. Genital warts can cause cancer. Asbestos can cause cancer. There are many ways to cause cancer besides ionizing radiation.
> Free radicals then can produce chain reactions, causing oxidative damage.
> The free radicals release by the inflammatory process can break covalent bonds and fragment macomolecules [sic s/b macromolecules: a molecule containing a large number of atoms. [....]
> This recently published article reviews published evidence that EMF can produce physiologic effects by altering the function of voltage gated calcium channels in cell walls.
> Pall ML. Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects. *J Cell Mol Med* (2013)

135. The above indicates Dr. Israel's lack of current scientific information regarding EMFs/RFs, their genotoxic effects and cancer.

136. To further indicate Dr. Israel's lack of expertise regarding EMFs and cancer research he conducts, **Dr. Israel admits that he did NO research on EMFs with physicists**. *Cf. Transcript pg. 324 (3-10)*

137. Frompovich introduced Exhibit O, aka Complainant Exhibit No. 2, *Cf. Transcript Pg. 232 (5-21)* a graphic depicting 2 pie charts explaining the **disparities existing in radiofrequency research between Non-industry research and Industry research.** Dr. Henry Lai, Professor Emeritus, Department of Bioengineering, University of Washington, prepared the data indicating **32% of Industry studies found harmful effects**. **That data indicates harmful effects have been found** but are not included in microwave industry "consensus science" or accepted as valid research, an arbitrary decision subject to serious **allegations of conflicts of interest, omissions, incorrect and misleading statements published in scientific papers and journals. ICNIRP**, an industrial professional society, **has been singled out** and a **member** (Prof. Anders Ahlborn, Karolinska Institute) was **forced to resign** from the WHO's IARC

working group on radiofrequencies. **ICNIRP data and information was quoted by PECO expert witnesses as accurate science.** *Cf. Transcript pg. 292 (19-24)*

138. Dr. Christopher Davis, Ph.D., testified *Cf. Transcript pg. 202 (21-24) and pg. 202 (105)*

> These expert organizations have collected information from many, many scientists, engineers, physicians, biologists and in many, many studies, and they've looked at what levels of radiofrequency exposure can actually be seen to produce an effect, and we're generally talking about effects in animals.
>
> And they found the lowest level that seemed to produce an effect in those animals, not necessarily a health effect but just an effect, and then they set the maximum permissible exposure 50 times lower than that value.
>
> And this has been generally accepted by the scientific and engineering and medical community as being a level that's extremely low and very protective of humans who are exposed.

139. Referring to *Brief Exhibit No. 3* "Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation" report of **conflicts of interest, omissions, inaccurate statement and misrepresentations regarding non-ionizing radiation**, plus the science and studies on cancer Frompovich was able to introduce into the testimony and **32% of industry-funded studies found adverse events,** there is legitimate doubt PECO experts are up to date on EMF/RF/ELF non-thermal adverse health effects, especially cancer.

140. Admitting cancer as an adverse non-thermal radiation health effect would not be in the microwave industry's best interests. However, almost daily, new scientific reports are published indicating exposure to microwaves from any "smart" device, including smart meters, exposes humans to non-thermal radiation. Furthermore, Frompovich introduced into testimony *Cf. Exhibit B-1 "IARC Classifies Radiofrequency Electromagnetic Fields as Possibly Carcinogenic to Humans." Cf. Transcript pp. 43 ((17-19) and 72 (20-23)*

141. Further documentation *cf. Brief Exhibit No. 6 "Some Effects of Weak Magnetic Fields on Biological Systems" / IEEE Power Electronics Magazine* **"RF field can change radical concentrations and cancer cell growth rates,"** indicates changes is magnetic fields, *e.g., The fact that birds, salmon, and other animals can sense small changes in the Earth's magnetic field and use them for navigation says that biological systems can sense small changes in those fields. [pg. 65] [....] The persistent production of abnormally large amounts of ROS and RNS, however, may lead to persistent changes in signal transduction and gene expression, which in turn, may give rise to pathological conditions. [pg. 66]* confirmation of the argument Frompovich presents regarding EMFs and DNA breaks since ROS leads to DNA breaks. *Cf. Argument pg. 30 DNA breaks from microwaves.* Further documentation is found in "Understanding EMFs For Engineers & Physicists." *Cf. Brief Exhibit No. 7*

142. PECO expert Dr. Christopher Davis answered Her Honor Judge Heep's question, "Again, for my information, why are the FCC limits different?" *cf. Transcript pg. 246 (16-17)*

143. Dr. Davis answered *cf. Transcript pg. 246 (18-21)* "Based on the standard setting bodies that have looked at exposures and they've looked at how the body absorbs different frequencies, they set the safety limits at different values for different frequencies." *Brief Exhibits Nos. 6 and 7* indicate Dr. Davis may not be up to speed on EMF emissions.

144. Frompovich points to PECO expert Dr. Davis testimony, since he was identified as a professor of electrical and computer engineering at the University of Maryland, and could not answer Frompovich's questions about electric surge arresters.

Page 241 (20-25)

Frompovich Q.: Those surge arresters have been taken off and not built into AMI smart meters; is that correct?

Davis A.: I don't know.

Frompovich Q.: Is that the case for PECO's AMI smart meter?

Davis A.: I don't know.

Page 241 (25) and Page 242 (1-14)
Frompovich Q.: Why don't you, if you were the one who certified the emissions and so on and so forth.

Davis A.: I was asked to evaluate the emissions and the power densities that result for people living in homes near these meters. I wasn't asked to look into the design of the meters specifically and whether they have surge protection or whether it could report to the fire brigade or anything else like that.

Frompovich Q.: Thank you. I have to set it up to as the question. Consequently, if surges passing through an AMI smart meter go into homes, can they damage appliances?

Davis A.: An electric surge, if it gets to the wrong kind of appliance, can damage it. I can't speak to whether the AMI meters allow surges to come through. Again, that is a question I think you should have asked of Mr. Pritchard.

145. Frompovich brings attention to the fact that Dr. Davis's answer seems uncannily "out of sorts" for an electrical engineering professor, especially one who has been brought into court as an "expert."

146. Another area where PECO expert Dr. Davis seems to lack expertise is

Transcript Page 235 (15-23)
Frompovich Q.: How come the AMI meter that you sort of scoped out for PECO has so much less electromagnetic emissions than the AMI meters that other scientists say put out? What is the specs, what are the specs, what's the difference, and how did you come by that certification or whatever you did for PECO?

Davis A.: I don't know of any other scientists or engineers who have done these calculations who've disagree with me.

Frompovich Q.: That's not what I asked. I asked, how did you do them, or can you --- I have the specs for them? There has to be specifications somewhere.

> Davis A.: I know the power that comes from a PECO AMI meter, for how long it turns on, how often it turns on, and I use the inverse square law to figure out what the power density is in milliwatts per square centimeter at a distance from the meter. This is a very standard scientific calculation that could be done by any engineer.

147. Frompovich points out Dr. Davis "certification" of PECO's *FlexNet* AMI Smart Meter electromagnetic emissions was performed as a human scientific calculation using the inverse square law to figure his answer(s). Frompovich contends with today's technological advancements, there has to be calibration equipment rather than human calculation to substantiate and/or authenticate PECO's smart meter emissions claims. Independent third party duplication and validation (a rudiment of science) of PECO's *FlexNet* Smart Meter claims are necessary in view of so much discrepancy between Frompovich's Electrosmog meter readings *Cf. Transcript pp. 14 (19-25) and 15 (1-6)*, published literature on AMI Smart Meters and the fact Frompovich could not find online the specifications for PECO's *FlexNet* EMF/RF/ELF emissions. That apparent PECO/Exelon oversight about their special *FlexNet* meter seems rather odd, especially if their meter is different in regard to EMF emissions as introduced into testimony and should be a "selling point" to offset customer rejection.

148. The Pennsylvania State Legislature passed HB2200 as a **no mandatory smart meter bill** *cf. pp. 9 and 10, Brief Exhibit 5 including PA State Senator Fumo's published statement:* "In addition, ***we did not mandate smart meters, but we made them optional***. We did say in new construction, where they really are practical, they will be put in."

149. The PA Public Utility Commission formulated smart meter implementation rules and regulations, which are **at variance with the legislative intent and history, and as passed and published in PA *House* and State *Journals*** *cf. p. 9.* Both PECO and the PA PUC are in violation of Act 129 (2008) as published of record. Frompovich, therefore, is not violating the

law as PECO and the PA PUC charge and, consequently, is not mandated to have a PECO *FlexNet* AMI Smart Meter on her home's electric service.

150. Whereas Frompovich now cites *Ed Friedman et al v. Public Utilities Commission, et al* 48 A.3d 794 (2012) [Docket PUC-11-532] Supreme Judicial Court of Maine wherein that honorable Commission enforced Claimant Friedman's U.S. Constitutional rights, which Frompovich raises in her complaint.

> The Commission concluded:
> The [complaint] alleges that in allowing RF to enter homes, CMP has violated the 4th, 5th, and 14th Amendments to the United States Constitution. **Claims for violations of rights guaranteed by the Federal Constitution may be brought pursuant to 42 U.S.C. §1983...**
>
> **The Commission does not have the jurisdiction to bring a suit under Section 1983 on behalf of the Complainants.**
>
> Apr. 15 Order, at 4-5.
> *Cf. Brief Exhibit No. 10 Ed Friedman et al v. Public Utilities Commission, et al 49 A.3d 794 (2012)*

151. Whereas, Frompovich now cites *Kyle vs. Southern California Edison* 30-2011-00513876-SC-CJC (Small Claims) wherein that Honorable Court found in favor of the Claimant Kyle.

> "**The Court finds judgment for David Kyle against Southern California Edison in the amount of $2500.00 damages, $50.00 costs, and $0 attorney fees.**
> "In lieu of payment and at the election of defendant, defendant may, not later than March 12, 2012, **replace the "smart meter" installed at the Kyle residence with the same type of meter previously in place at the Kyle residence prior to the installation of the "smart meter."** Counsel for SCE and Mr. Kyle shall confirm in writing to the Clerk of Department C-20 no later than March 16, 2012, as to what SCE's election was and, assuming that SCE elects to replace the meter, whether or not the replacement was accomplished on or before March 12, 2012. If the meter is timely replaced, then Plaintiff shall have judgement for costs only.
> "Case is ordered remanded to the Small Claims Court for enforcement of judgment.
> "Court orders Clerk's Office to give notice."

VII. PROPOSED ORDERING PARAGRAPHS

152. Whereas, Frompovich comes before this Honorable Court seeking a decree of relief from legal and customer harassment tactics by PECO and the PA PUC regarding the mandated retrofitting of an AMI Smart Meter on to her property at 23 Cavendish Drive, Ambler, Pennsylvania.

153. That Frompovich no longer will be considered in violation of Act 129 with no termination of electric power service to her home.

154. Whereas, Frompovich seeks her U.S. Constitution and Pennsylvania Constitution rights remain intact; enforced; not violated; nor impinged upon by PECO and/or the PA PUC.

155. Whereas, Act 129 (2008) implementation regulations generated by the PA PUC and PECO's smart meter retrofits are at variance with **HB2200 §2807(f)7(2) Legislative History** as published of record:

> **(2) Electric distribution companies shall furnish smart meter technology as follows:**
> **(i) Upon request from a customer that agrees to pay the cost of the smart meter at the time of the request.**
> **(ii) In new building construction.**
> **(iii) In accordance with a depreciation schedule not to exceed 15 years.**

156. Frompovich requests this Honorable Court to instruct the Pennsylvania Public Utility Commission to issue immediately revised and corrected implementation rules and regulations for AMI Smart Meters for electric, natural gas and water utilities customer services to reflect the non-mandatory status of smart meters the Pennsylvania State Legislature intended, enacted and was published of record in the *Pennsylvania House* and *Senate Journals*, and further issue automatic opt-outs with no special service fees, as Pennsylvania consumers have suffered

greatly due to misinformation and faulty implementation rules and regulations, and harassment in some cases.

157. PA State Senator Fumo is on record in *PA Senate Journal* October 8, 2008 (pp. 2626-2631) stating, "**In addition we did not mandate smart meters, but we made them optional.**" Therefore, the PA PUC, PECO and all public utilities in Pennsylvania by law must adhere to and abide by the optional smart meter mandate enacted by the Pennsylvania State Legislature, as only the Pennsylvania State Legislature can make law, not the Pennsylvania Public Utility Commission, a state administrative agency.

158. Whereas, Frompovich believes she was denied her constitutional right to include relevant published medical-scientific studies regarding 15 human breast cancer studies (1986 to 2005) and other cancers citing EMF/RF/ELF exposures in a compendium of almost 240 studies she tried introducing as Exhibit A-3 but was denied.

159. Whereas, PECO medical expert Dr. Mark A. Israel, MD, admitted the science is not certain, therefore, theoretical, prejudices Frompovich's constitutional rights to a fair hearing before this Honorable Court *cf. Transcript Pg. 290 (22-25).*

> *"Number two, non-thermal health effects have been widely studied but are still theoretical and have not been recognized by experts as a basis for changing regulatory exposure limits."*

160. Whereas, Frompovich's Exhibit of published cancer studies should have been admissible evidence because they were relevant to Frompovich's main case, however, they also should be admissible as Rebuttal Evidence.

161. Whereas, PECO's medical expert Dr. Mark A. Israel testified there are no scientific studies confirming the connection between EMF/RF/ELF and cancer.

162. Whereas, Frompovich challenges and rebuts Dr. Israel's testimony, which is medically and scientifically controversial thereby requiring Rebuttal Evidence submitted as Proffered Evidence. *Cf. Commonwealth v. O'Searo*, 466 Pa. 224, 229, 352 A.2d 30, 32 (1976)

163. Whereas, Frompovich believes PECO/Israel's testimony stating the science is uncertain, i.e., "theoretical," if accepted by this Honorable Court as valid, makes Frompovich the subject of an experiment without her consent, something prohibited by the Nuremberg Code[81].

Respectfully submitted,

Catherine J. Frompovich

Catherine J. Frompovich, *Pro Se*

Dated: January 20, 2017

[81] https://history.nih.gov/research/downloads/nuremberg.pdf

Exhibit No. 1

Sage-Carpenter Recommendations to FCC

ET Docket No. 13-84 and ET Docket No. 03-137

FCC 13-39

Before the Federal Communications Commission

Washington, D.C. 20554

In the Matter of

Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies	)	ET Docket No. 13-84
Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields	)	ET Docket No. 03-137

To: Office of the Secretary
Federal Communications Commission , Washington, DC 20554

As officially presented in the Federal Register/ Vol. 78, No. 107 / Tuesday, June 4, 2013 / Proposed Rules. Federal Communications Commission, 47 CFR Parts 1, 2, 15, 24, 25, 27, 73, 90, 95, 97, and 101 [ET Docket Nos. 03–137 and 13–84; FCC 13–39], Reassessment of Exposure to Radiofrequency Electromagnetic Fields Limits and Policies, Federal Communications Commission

Comment Filed by: **Cindy Sage and David O. Carpenter, Co-Editors, BioInitiative Report**

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BioInitiative 2007 Report Conclusions

1) The 2007 BioInitiative Report conclusively established that low-intensity (non-thermal) bioeffects and adverse health effects of non-ionizing electromagnetic radiation (NIER) at levels significantly below existing public exposure standards.

2) The International Committee on Non-Ionizing Radiation Protection (ICNIRP) and the Institute for Electrical and Electronic Engineers/Federal Communications Commission (IEEE/FCC) public safety limits are inadequate and obsolete with respect to prolonged, low-intensity NIER exposures, based on an expert group's review of more than 2000 peer-reviewed and published scientific studies and reviews.

3) New, biologically-based public exposure standards are urgently needed to protect public health world-wide.

4) It is not in the public interest to wait.

5) The BioInitiative 2007 Report recommends a 0.1 microwatt per square centimeter limit for outdoor exposure for combined AM, FM, TV and wireless frequencies.

Background: The BioInitiative Report is an internationally acclaimed scientific and public health report on potential health risks of electromagnetic fields and radiofrequency/microwave radiation. In 2007, the BioInitiative Working Group, an international collaboration of prestigious scientists and public health experts from Columbia University and the University at Albany (New York), University of Washington (Seattle), the Karolinska Institute, Umea University and Orebro University Hospital (Sweden), the European Environmental Agency (Denmark) Medical University of Vienna (Austria) and Zhejiang University School of Medicine, (China) released a 650-page report citing more than 2000 studies that document health effects of EMFs from all sources. It is incorporated by reference in this filing.

The BioInitiative Report was produced for publication to the broadest possible audience, hence placed on the Web. Much of the BioInitiative Report content, including updated chapters and new chapters was published in a special two-volume issue of the journal Pathophysiology (August 2009, Pathophysiology 16: 2,3).

It documented that chronic exposure to electromagnetic fields (EMF) is associated in some scientific studies with increased health risks that vary from impaired learning, headaches, mental confusion, skin rashes, tinnitus and disorientation to a variety of cancers, and neurological diseases like amyotrophic lateral sclerosis (ALS) and Alzheimer's. Sources of concern may include but are not limited to power lines, cell and cordless phones, cell towers, WI-FI, WiMax and wireless internet.

Strong concern was voiced by scientists and public health and environmental policy experts, that the deployment of technologies that expose billions of people worldwide to new sources of EMF may pose a pervasive risk to public health. Such exposures did not exist before the age of industry and information. Prolonged exposure appears to disrupt biological processes that are fundamental

to plant, animal and human growth and health. Life on earth did not evolve may pose a pervasive risk to public health. Such exposures did not exist before the age of industryand information. Prolonged exposure appears to disrupt biological processes that are fundamental to plant, animal and human growth and health. Life on earth did not evolve with biological protections or adaptive biological responses to these EMF exposures. A rapidly accumulating body of scientific evidence of harm to health and well- being constitute warnings that adverse health effects can occur with prolonged exposures to very low-intensity EMF at biologically active frequencies or frequency combinations.

BioInitiative 2012 Report Conclusions

1) The 2012 BioInitiative Report was prepared by 29 international experts studying more than 1800 new peer-reviewed scientific studies published since 2007 and concluded again that exposure to EMF and radiofrequency radiation (RFR) produces biological effects and adverse health effects at levels significantly below existing public exposure standards; and substantially below levels identified in 2007.

2) The scientific evidence for health harm in 2012 is stronger and more consistent than in 2007; and the levels of exposure at which biological effects and adverse health impacts are reported to occur are far lower than in 2007.

3) ICNIRP and IEEE/FCC public safety limits remain unchanged and are still inadequate and obsolete with respect to prolonged, low-intensity NIER exposures. Worse, FCC Dockets 13-84, 03-137 and 13-39 propose to significantly relax rather than tighten exposure standards, in stark contrast to what the scientific evidence suggests is needed to protect public health from RFR.

4) Specific absorption rate (SAR) as a measure of compliance with new biologically-based exposure limits should be abandoned. Setting public safety limits based on heating is an unsuitable starting point for developing new standards that properly address chronic exposures to very low-intensity RFR. SAR should not be applied to new biologically-based public exposure standards since by definition SAR is a measure of tissue heating, and the biological effects of NIER are by definition, not due to a heating mechanism. It makes no sense to continue misapplying existing thermal concepts of biological harm, time-averaging and metrics for thermal heating as a basis for detecting and preventing harm from new wireless technologies in the face of strong evidence of harm without measureable heating.

5) New, biologically-based public exposure standards should be developed under the direction of experts in the biological effects and adverse health effects of chronic exposures to electromagnetic fields, drawing upon the substantial international body of scientific and public health literature, and not be limited to individuals in electrical and electronic engineering.

6) The agency to develop new biologically-based public exposure standards should be chosen to avoid the conflicts present now where the FCC acts both as the auctioneer to promote sale and use of radiofrequency radiation spectrum and works to actively enable the telecommunications

and electronics industries to develop and market new technologies through FCC compliance testing (Grants of Authorization). At the same time the FCC is charged with adopting effective

public health limits (for which it admits it has no health expertise) and for enforcing compliance with FCC public safety limits (for which it has a dismal and ineffective track record).

7) Immediate precautionary actions are urgently needed. New safety standards will take time to be developed and implemented. Societies in the interim need to begin making changes to reduce exposures now from wireless technologies (communications, data transmission, transportation, surveillance, environmental and medical monitoring, medical implants, etc.) in the interim.

8) It is not in the public interest to wait. The continued rollout of wireless technologies and devices puts global public health at risk from unrestricted wireless commerce unless new and far lower exposure limits and strong precautionary warnings for their use are implemented. Many millions of people, including the most vulnerable populations (the fetus, young children, the ill, the elderly and those with extreme sensitivity to exposures) who are affected by second-hand wireless radiation exposures must have better protection.

9) The cost of doing nothing is unacceptable. Substantial evidence for health risks from chronic exposure to wireless technologies cannot be dismissed in 2012, and if we do nothing, it will simply worsen rates of chronic diseases, disability and premature mortality.

10) The BioInitiative 2012 Report reports biological effects at exposure levels significantly below the 2007 recommended goal of 0.1 uW/cm2. Since 2007, five new studies of base-station level RFR at intensitites ranging from less than 0.001 uW/cm2 to 0.05 uW/cm2 report headaches, concentration difficulties and behavioral problems in children and adolescents; and sleep disturbances, headaches and concentration problems in adults. If these results are confirmed to be due to RFR exposure exposure standards may need to be set at even lower levels in the future, as new and better studies are completed.

Background: The BioInitiative 2012 Report concludes that the evidence for health risks from electromagnetic fields (EMFs) generated by wireless technologies have substantially increased since 2007. A review of over 1800 new scientific studies indicates current guidelines are inadequate to protect the public from chronic exposure to very low-intensity (non-thermal) electromagnetic fields and radiofrequency radiation (EMF and RFR). It is incorporated by reference in this filing.

The 2012 BioInitiative Report was prepared by 29 authors from ten countries, ten holding medical degrees (MDs), 21 PhDs, and three MsC, MA or MPHs. Among the authors are three former Presidents of the Bioelectromagnetics Society and five full members of BEMS. One distinguished author is the Chair of the Russian National Committee on Non-Ionizing Radiation. Another is a Senior Advisor to the European Environmental Agency. Full titles and affiliations of authors is in Section 25 of the BioInitiative Report at www.bioinitiative.org

In twenty-four technical chapters, the BioInitiative Working Group authors discuss the content and implications of about 1800 new studies since 2007. Overall, these new studies report abnormal gene transcription (Section 5); genotoxicity and single-and double-strand DNA damage (Section 6); stress proteins because of the fractal RF-antenna like nature of DNA (Section 7); chromatin condensation and loss of DNA repair capacity in human stem cells (Sections 6 and 15); reduction in free-radical scavengers - particularly melatonin (Sections 5, 9, 13, 14, 15, 16 and 17); neurotoxicity in humans and animals (Section 9); carcinogenicity in humans (Sections 11, 12, 13, 14, 15, 16 and 17); serious impacts on human and animal sperm morphology and function (Section 18); effects on the fetus, neonate and offspring (Section 18 and 19); effects on brain and cranial bone development in the offspring of animals that are exposed to cell phone radiation during pregnancy (Sections 5 and 18); and findings in autism spectrum disorders consistent with EMF/RFR exposure effects. Global precautionary actions that have been taken in countries around the world, and recommended by medical and research experts are documented in Section 22. Use of the Precautionary Principal and it's relevance are presented in Section 23. Key scientific evidence and public health policy recommendations are in Section 24.

See Appendix A for specific conclusions and findings of the BioInitiative 2012 Report, and see the Report at www.bioinitiative.org

Recommendations to the FCC

The FCC review of health and safety standards for radiofrequency radiation as presented (Federal Register/ Vol. 78, No. 107 / Tuesday, June 4, 2013 / Proposed Rules. Federal Communications Commission, 47 CFR Parts 1, 2, 15, 24, 25, 27, 73, 90, 95, 97, and 101 [ET Docket Nos. 03–137 and 13–84; FCC 13–39], Reassessment of Exposure to Radiofrequency Electromagnetic Fields Limits and Policies, Federal Communications Commission) does not begin to properly address the current scientific evidence that conclusively demonstrates biological effects and some adverse health effect of EMF and RFR exposures at low-intensity (non-thermal) exposure levels. The BioInitiative Reports (2007 and 2012) should define the discussion range for new chronic exposure limits; and not be drawn from re-examination of existing thermal standards.

In fact, these proposed rules and regulations relax rather than tighten exposure levels in the face of overwhelming scientific evidence that an entirely new paradigm for developing safety standards is warranted, and in fact, overdue. For example, declaring the pinna of the ear (the earlobe) to be an extremity, so as to allow a huge increase in allowable SAR exposure [5] at the head (affecting the brain including the auditory and other cranial nerves, the eye and salivary glands in the cheek) is reckless and unsupported by any legitimate expert review of the available evidence. [1,2,3] The FCC has not considered the special biology of the developing fetus, the young child, people of small stature, people with medical implants for serious chronic diseases and chronic pain in these proposed rule changes. These changes avoid making exposure-relevant reductions keyed to scientific benchmarks established in hundreds of in peer-reviewed, published studies reporting low-intensity (non-thermal) effects of chronic (prolonged) exposures now common in public life.

The new FCC public exposure limits must take into account the variable conductivity and permittivity of tissues of various ages and developmental stages and aging of humans, and the exquisite sensitivity of the human reproductive cells.

1) SUPPORT DEVELOPMENT OF NEW, BIOLOGICALLY-BASED PUBLIC SAFETY LIMITS BY A QUALIFIED AGENCY OR PROFESIONAL ORGANIZATION:

The FCC'S thermal-based public safety MPEs and the SAR approach are useful to prevent tissue heating and damage; but not useful to protect the public against chronic exposures (as opposed to acute exposures) biologically active non-thermal, low-intensity NIER.

2) RECOGNIZE THE WHO IARC CLASSIFICATION OF RFR:

The WHO IARC classified RF radiation as a Group 2B Possible Human Carcinogen; it joins the IARC classification of ELF-EMF (Extremely Low Frequency Electromagnetic Fields) as a Group 2B Possible Human Carcinogen, which the FCC has also ignored. The evidence for carcinogenicity for RFR was primarily from cell phone/brain tumor studies but IARC applies this classification to all RFR exposures.

3) ADOPT SPECIFIC LANGUAGE ENDORSING THE PRECAUTIONARY PRINCIPLE:

The Commission should address and incorporate appropriate precautionary, public-health based measures to take into account the recent World Health Organization International Agency for Research on Cancer (IARC) classification of RFR as a Possible Human Carcinogen before subjecting widespread national populations to a preventable toxic exposure.

4) DEFINE BIOLOGICAL EFFECT AS HARMFUL INTERFERENCE WITH BIOLOGICAL ORGANISMS

A definition of biological effects should key to such effects that can reasonably be presumed to result in adverse health effects from exposure to RFR including but not limited to DNA damage; immune, blood-brain barrier, and calcium channel disruption; disturbed circadian rhythms; hormone dysregulation; degraded cognition and sleep; disrupted autonomic regulation; desynchronization of neural activity and other biological consequences of acute or chronic exposure to low-intensity NIER as documented in the BioInitiative 2007 and 2012 Reports.

5) RECLASSIFICATION OF THE PINNA SHOULD BE DEFERRED:

A reclassification of the pinna should be delayed by the FCC in all open dockets pertaining to completion of the FCC's review of RFR health effects and proposed FCC compliance testing rule changes. New studies show adverse effects without relaxing this limit. [1,2,3,4]. Lin [5] gives an answer to the FCC's question asking on page 79 "*We request comment on the significance, if any, of the differences between these standards. For example, we request comment on whether using an averaging mass of 10 grams over a contiguous layer of tissue would yield a significantly different SAR value than that averaged over a 1-gram cube and whether that difference would be consistently higher or lower, particularly with enough consistency to be able to establish a definable relationship between the measurement methods*". See footnote to reference (5)

6) NEPA ASSESSMENT FOR FINAL RULES – APPENDIX A AND B

The Commission should require a NEPA assessment for Final Rules (App. A) and Proposed Rules (App. B). Proposed Rules in Appendix B, in particular, have the potential to adversely affect human health and environmental resources.

7) COMPLIANCE TESTING REQUIREMENTS

a) **Medical and Metal Implants**: Metal detectors in the 9 kHz range are not covered by current FCC rules and should be addressed with respect to the public with disabilities (medical and metal implants). People with deep brain stimulators for Parkinson's disease are unable to pass through metal detectors because evidence exists that such exposures can shut down the electrodes in these devices, and such exposures are now preventing people with deep brain stimulators from normal activities (shopping, air travel, hospitals and health care facilities, attendance at public meetings and events, etc).

b) **Distance Exemptions**: More realistic provisions must be developed regarding distancing from RFR transmitters (wireless devices, wireless access points and routers, baby monitors, wireless utility meters, etc) for infants and children who cannot reasonably be expected to observe FCC rules for 20 cm or 40 cm separation. The basis for exemptions from routine evaluations (Appendix C – fixed, mobile or portable RF sources) assumes conservative derivations or worst-case predictions leading to "*minimal likelihood for the exposure limits for the general public to be exceeded*" based on faulty logic about what can be expected with regard to the general public knowing or being able to avoid breaching an arbitrary 20 cm or 40 cm distances.

c) **Compliance Testing**: Realistic assumptions about operation of wireless utility meter devices ('smart meters') should be mandatory in FCC testing and issuance of Grants of Authorization. FCC testing labs ignore the obvious two-antenna or three-antenna design of wireless utility meters, yet issue 'Conditions' for compliance that specify "*this compliance test is issued with the condition that the antenna may not operate in conjunction with other antennas*". The FCC cannot reasonably issue Grants of Authorization based on lab testing that ignores typical construction of the device, and how in common practice it is installed and operated.

d) **Cumulative Effects**: Cumulative effects of RFR exposures from multiple wireless devices and environmental exposures are not sufficiently addressed, measured or tested under current or proposed FCC rules. The 2008 NAS Report on Research Needs for Wireless Device summarizes deficiencies for wireless effects on children, adolescents and pregnant women; wireless personal computers and base station antennas; multiple element base station antennas under highest radiated power conditions; hand-held cell phone compliance testing; and better dosimetric absorbed power calculations using realistic anatomic models for both men, women and children of different height and ages. Realistic assessments of cumulative RFR exposures need to be addressed, taking into account the high variability in environmental situations; and safety buffers below 'effects levels' need to be built into new FCC public safety limits.

e) **100% Duty Cycle**: FCC OET 65 should make clear that a 100% duty cycle will continue to be required in calculations of power density 'where the public cannot be excluded'.

f) **Time-Averaging vs Pulsed RFR**: New public exposure limits for pulsed RFR are needed, rather than specifying compliance limits based on time-averaged fields. Many new wireless devices and exposures create pulsed RFR for users; such exposures are linked to biological disruption effects and adverse health impacts. Time-averaging is biologically inappropriate where such measurements effectively camouflage exposures by mathematical dilution. Positive assertions of safety of pulsed RFR exposures that are characterized only by time-averaging have been shown to be unsupportable.

8. **Basis for Biologically-based Public Exposure Limits**: Recommendations for new, biologically-based public exposure standards should not be derived from existing FCC/IEEE C95.1 thermal standards, which have other useful purposes but which are obsolete with respect to low-intensity, chronic exposure to new wireless technologies.

Respectfully submitted:

Cindy Sage, Co-Editor **David O. Carpenter, MD, Co-Editor**

The 2007 and 2012 BioInitiative Reports at www.bioinitiative.org are incorporated by reference.

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5. J.C Lin. Update of IEEE Radio Frequency Exposure Guidelines. Health Effects. IEEE Microwave Magazine, April 2006. Footnote below.

"First and foremost, for the first time in its history, the new IEEE standard instituted an exclusion for the pinnae or the external ears by relaxation of the above-mentioned basic SAR restriction from 2 W/kg to 4 W/kg. This choice segregates tissues in the pinnae apart from all other tissues of the human head. Of equal significance is the basic restriction for localized exposure at 2 W/kg in terms of SAR averaged over any 10 g of tissue. The SAR value has been increased from 1.6 W/kg averaged over any 1 g of tissue to 2 W/kg over any 10 g of tissue. Aside from the numerical difference between the SARs, the volume of tissue mass used to define the SARs in the new standard was increased from 1 g to 10 g. ***The increase in tissue mass can have a profound influence on the actual quantityof RF energy allowed to be deposited in tissue by the new exposure standard.*** *It has been well established that the distribution of absorbed microwave energy is nonuniform, and it varies greatly from point to point inside a body.* ***An averaging volume that is as large as 10 g would tend to artificially flatten out the SAR distribution, whether it is computed or measured.*** *And the smoothing tends to substantially reduce the resulting SAR value.* ***Thus, a 10-g SAR at 2 W/kg could be equivalent to 1-g SARs of 5 W/kg or higher. Simply put, the absorbed energy averaged over a defined tissue mass of 10 g is inherently low compared to a 1-g SAR."*** *(emphasis added)*

Exhibit No. 2

American Academy of Environmental Medicine

Electromagnetic and Radiofrequency Fields Effect on Human Health

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Electromagnetic and Radiofrequency Fields Effect on Human Health

For over 50 years, the American Academy of Environmental Medicine (AAEM) has been studying and treating the effects of the environment on human health. In the last 20 years, our physicians began seeing patients who reported that electric power lines, televisions and other electrical devices caused a wide variety of symptoms. By the mid 1990's, it became clear that patients were adversely affected by electromagnetic fields and becoming more electrically sensitive. In the last five years with the advent of wireless devices, there has been a massive increase in radiofrequency (RF) exposure from wireless devices as well as reports of hypersensitivity and diseases related to electromagnetic field and RF exposure. Multiple studies correlate RF exposure with diseases such as cancer, neurological disease, reproductive disorders, immune dysfunction, and electromagnetic hypersensitivity.

The electromagnetic wave spectrum is divided into ionizing radiation such as ultraviolet and X-rays and non-ionizing radiation such as radiofrequency (RF), which includes WiFi, cell phones, and Smart Meter wireless communication. It has long been recognized that ionizing radiation can have a negative impact on health.

However, the effects of non-ionizing radiation on human health recently have been seen. Discussions and research of non-ionizing radiation effects centers around thermal and non-thermal effects. According to the FCC and other regulatory agencies, only thermal effects are relevant regarding health implications and consequently, exposure limits are based on thermal effects only.[1]

While it was practical to regulate thermal bioeffects, it was also stated that non-thermal effects are not well understood and no conclusive scientific evidence points to non-thermal based negative health effects.[1] Further arguments are made with respect to RF exposure from WiFi, cell towers and smart meters that due to distance, exposure to these wavelengths are negligible.[2] However, many in vitro, in vivo and epidemiological studies demonstrate that significant harmful biological effects occur from non-thermal RF exposure and satisfy Hill's criteria of causality.[3] Genetic damage, reproductive defects, cancer, neurological degeneration and nervous system dysfunction, immune system dysfunction, cognitive effects, protein and peptide damage, kidney damage, and developmental effects have all been reported in the peer-reviewed scientific literature.

Genotoxic effects from RF exposure, including studies of non-thermal levels of exposure, consistently and specifically show chromosomal instability, altered gene expression, gene mutations, DNA fragmentation and DNA structural breaks.[4-11] A statistically significant dose response effect was demonstrated by Maschevich et al. , who reported a linear increase in aneuploidy as a function of the Specific Absorption Rate(SAR) of RF exposure.[11] Genotoxic effects are documented to occur in neurons, blood lymphocytes, sperm, red blood cells, epithelial cells, hematopoietic tissue, lung cells and bone marrow. Adverse developmental effects due to non-thermal RF exposure have been shown with decreased litter size in mice from RF exposure well below safety standards.[12] The World Health Organization has classified RF emissions as a group 2 B carcinogen.[13] Cellular telephone use in rural areas was also shown to be associated with an increased risk for malignant brain tumors. [14]

The fact that RF exposure causes neurological damage has been documented repeatedly. Increased blood-brain barrier permeability and oxidative damage, which are associated with brain cancer and neurodegenerative diseases, have been found.[4,7,15-17] Nittby et al. demonstrated a statistically significant dose-response effect between non-thermal RF exposure and occurrence of albumin leak across the blood-brain barrier.[15] Changes associated with degenerative neurological diseases such as Alzheimer's, Parkinson's and Amyotrophic Lateral Sclerosis (ALS) have been reported.[4,10] Other neurological and cognitive disorders such as headaches, dizziness, tremors, decreased memory and attention, autonomic nervous system dysfunction, decreased reaction times, sleep disturbances and visual disruption have been reported to be statistically significant in multiple epidemiological studies with RF exposure occurring non-locally.[18-21]

Nephrotoxic effects from RF exposure also have been reported. A dose response effect was observed by Ingole and Ghosh in which RF exposure resulted in mild to extensive degenerative changes in chick embryo kidneys based on duration of RF exposure.[24] RF emissions have also been shown to cause isomeric changes in amino acids that can result in nephrotoxicity as well as hepatotoxicity.[25]

Electromagnetic field (EMF) hypersensitivity has been documented in controlled and double blind studies with exposure to various EMF frequencies. Rea et al. demonstrated that under double blind placebo controlled conditions, 100% of subjects showed reproducible reactions to that frequency to which they were most sensitive.[22] Pulsed electromagnetic frequencies were shown to consistently provoke neurological symptoms in a blinded subject while exposure to continuous frequencies did not.[23]

Although these studies clearly show causality and disprove the claim that health effects from RF exposure are uncertain, there is another mechanism that proves electromagnetic frequencies, including radiofrequencies, can negatively impact human health. Government agencies and industry set safety standards based on the narrow scope of Newtonian or "classical" physics reasoning that the effects of atoms and molecules are confined in space and time. This model supports the theory that a mechanical force acts on a physical object and thus, long-range exposure to EMF and RF cannot have an impact on health if no significant heating occurs. However, this is an incomplete model. A quantum physics model is necessary to fully understand and appreciate how and why EMF and RF fields are harmful to humans.[26,27] In quantum physics and quantum field theory, matter can behave as a particle or as a wave with wave-like properties. Matter and electromagnetic fields encompass quantum fields that fluctuate in space and time. These interactions can have long-range effects which cannot be shielded, are non-linear and by their quantum nature have uncertainty. Living systems, including the human body, interact with the magnetic vector potential component of an electromagnetic field such as the field near a toroidal coil.[26,28,29] The magnetic vector potential is the coupling pathway between biological systems and electromagnetic fields.[26,27] Once a patient's specific threshold of intensity has been exceeded, it is the frequency which triggers the patient's reactions.

Long range EMF or RF forces can act over large distances setting a biological system oscillating in phase with the frequency of the electromagnetic field so it adapts with consequences to other body systems. This also may produce an electromagnetic frequency imprint into the living system that can be long lasting.[26,27,30] Research using objective instrumentation has shown that even passive resonant circuits can imprint a frequency into water and biological systems.[31] These quantum electrodynamic effects do exist and may explain the adverse health effects seen with EMF and RF exposure. These EMF and RF quantum field effects have not been adequately studied and are not fully understood regarding human health.

Because of the well documented studies showing adverse effects on health and the not fully understood quantum field effect, AAEM calls for exercising precaution with regard to EMF, RF and general frequency exposure. In an era when all society relies on the benefits of electronics, we must find ideas and technologies that do not disturb bodily function. It is clear that the human body uses electricity from the chemical bond to the nerve impulse and obviously this orderly sequence can be disturbed by an individual-specific electromagnetic frequency environment. Neighbors and whole communities are already exercising precaution, demanding abstention from wireless in their homes and businesses.

Furthermore, the AAEM asks for:

- An immediate caution on Smart Meter installation due to potentially harmful RF exposure.
- Accommodation for health considerations regarding EMF and RF exposure, including exposure to wireless Smart Meter technology.
- Independent studies to further understand the health effects from EMF and RF exposure.
- Recognition that electromagnetic hypersensitivity is a growing problem worldwide.
- Understanding and control of this electrical environmental bombardment for the protection of society.
- Consideration and independent research regarding the quantum effects of EMF and RF on human health.
- Use of safer technology, including for Smart Meters, such as hard-wiring, fiber optics or other non-harmful methods of data transmission.

Submitted by: Amy L. Dean, DO, William J. Rea, MD, Cyril W. Smith, PhD, Alvis L. Barrier, MD

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Exhibit No. 3

Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation

Reviews on Environmental Health – De Gruyter

Open Access

Sarah J. Starkey*

Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation

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Abstract: The Advisory Group on Non-ionising Radiation (AGNIR) 2012 report forms the basis of official advice on the safety of radiofrequency (RF) electromagnetic fields in the United Kingdom and has been relied upon by health protection agencies around the world. This review describes incorrect and misleading statements from within the report, omissions and conflict of interest, which make it unsuitable for health risk assessment. The executive summary and overall conclusions did not accurately reflect the scientific evidence available. Independence is needed from the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the group that set the exposure guidelines being assessed. This conflict of interest critically needs to be addressed for the forthcoming World Health Organisation (WHO) Environmental Health Criteria Monograph on Radiofrequency Fields. Decision makers, organisations and individuals require accurate information about the safety of RF electromagnetic signals if they are to be able to fulfil their safeguarding responsibilities and protect those for whom they have legal responsibility.

Keywords: AGNIR; brain; cognition; development; EEG; electromagnetic; fertility; genotoxicity; health; ICNIRP; immune; membranes; misleading; oxidative stress; proteins; Public Health England (PHE); symptoms; tumours; wireless; WHO.

Introduction

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) set international exposure guidelines for radiofrequency (RF) electromagnetic fields in 1998 (1). Conclusions from subsequent ICNIRP reviews have supported the guidelines. Within the United Kingdom (UK), Public Health England (PHE) commission scientific reviews by the Advisory Group on Non-ionising Radiation (AGNIR) to assess the safety of RF fields. AGNIR reviews, along with PHE in-house assessments of exposures, form the basis of PHE's advice on the safety of RF signals. This guides the UK government, organisations and decision makers when assessing the safety of wireless devices and infrastructure. The latest AGNIR review (2) has also been relied upon by health protection agencies around the world, including the Australian Radiation Protection and Nuclear Safety Agency (3) and Health Canada (4).

The majority of the global population absorb RF radiation on a daily basis from smartphones, tablet computers, body-worn devices, Wi-Fi and Bluetooth transmitters, cordless phones, base stations, wireless utility meters and other transmitters. For public health to be protected, decisions need to be based on accurate information. The AGNIR report is considered here for conflicts of interest and scientific accuracy.

Conflicts of interest

PHE stated, "*The 2012 AGNIR report considered whether there was evidence for health effects occurring in relation to exposures below the ICNIRP levels*" (5). At the time of writing the report, the chairman of AGNIR was also chair of the ICNIRP standing committee on epidemiology. Currently, six members of AGNIR and three members of PHE or its parent organisation, the Department of Health (DH), are or have been part of ICNIRP (Table 1). When the group charged with assessing whether there is evidence of health effects occurring at exposures below current ICNIRP values have members who are responsible for setting the guidelines, it introduces a conflict of interest. How can AGNIR report that the scientific literature contains evidence of harmful effects below the current guidelines when several of them are responsible for those guidelines? PHE provide

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the official advice on the safety of wireless signals within the UK, but having members in ICNIRP introduces a conflict of interest which could prevent them from acknowledging adverse effects below ICNIRP guidelines.

PHE (the then Health Protection Agency) responded to the report with "*The Health Protection Agency welcomes this comprehensive and critical review of scientific studies prepared by the independent Advisory Group on Non-ionising Radiation*" (6). The implication was that an independent group had produced the report and presented it to PHE. However, at the time of writing, 43% of those in AGNIR were from PHE or the DH (2) (Table 1). PHE had misleadingly welcomed the report which they were involved in preparing.

Scientific accuracy

The executive summary of the AGNIR report included "*Taken together, these studies provide no evidence of health effects of RF field exposures below internationally accepted guideline levels*" [page 3 of the report (2)] and "*the evidence considered overall has not demonstrated any adverse health effects of RF field exposures below internationally accepted guideline levels*" [page 4 (2)]. Accuracy is vital when most people only read the executive summary and overall conclusions from a 348-page report and national and international public health decisions and exposures are based on them. These conclusions did not accurately reflect the evidence, as described in examples below.

(a) Studies were omitted, included in other sections but without any conclusions, or conclusions left out; (b) evidence was dismissed and ignored in conclusions; (c) there were incorrect statements. Terms such as 'convincing' or 'consistent' were used to imply that there was no evidence. Some examples fall into more than one category.

(a) Studies omitted, included in other sections but without any conclusions, or conclusions left out

Only 7 studies were included in the section on reactive oxygen species [ROS; page 94 (2); Figure 1]. These were summarised by "*production of reactive oxygen species (ROS) were increased in some studies, but not others*" [page 106 (2)]. At least a further 30 studies relevant to ROS or the possible resulting damaging state of oxidative stress were included throughout the report, but with no reference to ROS or oxidative stress within the main text for 16 of these (listed in Supplementary Information, SI) and no mention of this subject in any other summaries or conclusions. At least 40 studies were omitted (using AGNIR restriction to the English language; identified from PubMed and EMF-Portal databases or references within the papers; SI). If these had been included, 79% of studies (61 out of 77) would have demonstrated evidence of significantly increased ROS or oxidative stress in response to

Table 1: AGNIR in 2012 and 2016 and membership of ICNIRP, PHE or DH.

AGNIR 2012		AGNIR 2016	
Swerdlow A.J. (Chair)	ICNIRP Chair of standing committee on epidemiology	Swerdlow A.J. (Chair)	formerly ICNIRP
Conney S.W.	DH	Conney S.W.	DH
Coulton L.A.		Coulton L.A.	
Duck F.A.		Duck F.A.	ICNIRP
Feychting M.	ICNIRP	Feychting M.	Vice-Chair ICNIRP
Haggard P.		Haggard P.	
Lomas D.J.		Lomas D.	
Noble D.			
Mann S.M.	HPA	Mann S.M.	ICNIRP, PHE
Maslanyj M.P.	HPA	Maslanyj M.P.	PHE
Meara J.R.	HPA	Meara J.R.	PHE
		O'Hagan J.O.	ICNIRP, PHE
Peyman A.	HPA	Peyman A.	PHE
		Powers H.	
		Rhodes L.	
Rubin G.J.		Rubin G.J.	
Sienkiewicz Z.J.	ICNIRP, HPA	Sienkiewicz Z.J.	ICNIRP, PHE
		Tedstone A.	PHE
		Young A.	

PHE was formerly known as the Health Protection Agency, HPA. PHE is part of the Department of Health, DH.

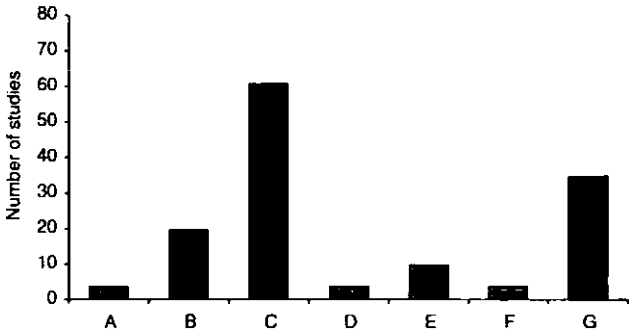

Figure 1: Comparison of the number of studies included in the AGNIR report with those that could have been, for ROS, oxidative stress or male fertility.
(A) studies included in the ROS section; (B) studies scattered throughout the report on ROS or oxidative stress (but with no summary or conclusion); (C) studies which could have been included for ROS or oxidative stress; (D) studies included on male fertility in the cellular studies chapter; (E) studies included on male fertility in animal studies; (F) studies included on male fertility in humans (in vivo); (G) studies which could have been included for male fertility. Dark shading indicates evidence of significant increase of ROS or oxidative stress, adverse effect on male fertility or altered male testosterone concentrations in response to a radiofrequency field; light shading indicates no significant increase of ROS or oxidative stress, adverse effect on male fertility or altered male testosterone concentrations. Studies are listed in SI.

RF fields (Figure 1; SI). By only including a few of the available studies, not referring to many scattered throughout the report and not mentioning ROS or oxidative stress in any conclusions or the executive summary, this important area of research was misrepresented. Oxidative stress is a toxic state which can lead to cellular DNA, RNA, protein or lipid damage (7, 8), is accepted as a major cause of cancer (7), as well as being implicated in many reproductive, central nervous system, cardiovascular, immune and metabolic disorders (7–14).

The conclusion for male fertility studies in animals was "*A substantial number of studies have investigated the effects of RF fields on testicular function, principally in rats, and most report large, obvious effects. However, these results are largely uninterpretable due to inadequate dosimetry or other shortcomings in the studies, and thus are unsuitable for the purposes of health risk assessment. One well-conducted study reported no effects on testicular function in rats exposed to 848 MHz CDMA signals*" [page 191 (2)]. For male fertility in humans (in vivo), it was concluded, "*The evidence on the effect of RF fields on sperm quality is still weak and the addition of the two new studies does not allow reliable evaluation of the presence or absence of a health effect. Some suggestive positive results, although not convincing, give justification for further studies with improved methods. The evidence on effects on male subfertility is very limited, and allows no conclusions*".

At least 22 studies on male fertility were omitted (AGNIR restriction to the English language; identified from PubMed or EMF-Portal databases or references within the papers; listed in SI). Considering those identified as included throughout the report (excluding three subsequently retracted, SI), 78% of studies (18 out of 23) described significant adverse effects on sperm, male reproductive organs or changes in male testosterone concentrations (SI). If the 22 references identified as omitted had also been included, this would have been 35 out of 45, 78% (Figure 1; SI). Isolating small samples of evidence in chapters on cells, animals or humans (Figure 1) may have made it easier to dismiss significant effects on male reproductive health. Inaccurately, in the overall and executive summaries, the evidence for adverse effects on male fertility disappeared: "*Despite many studies investigating effects on male fertility, there is no convincing evidence that low level exposure results in any adverse outcomes on testicular function*" [page 192 (2)] and for humans, in vivo, "*The limited available data on other non-cancer outcomes show no effects of RF field exposure*" [page 4 (2)]. The term 'convincing' is subjective and can erroneously imply that there is no evidence. The human data on male fertility did not show "*no effects of RF field exposure*".

Some studies, mostly those which had tested signals from real mobile devices, were dismissed as uninterpretable because they had not described the dosimetry, the process of determining internal electromagnetic quantities relating to exposure in tissues, in enough detail. Limited descriptions restrict possible interpretations, but do not make them uninterpretable. If the question is 'do mobile phone signals damage male fertility?', real phone signals are highly relevant because they allow possible effects of the complex patterns of fields to which humans are exposed to be investigated. ICNIRP only accept thermal effects of RF fields and focus on average energy absorbed. Highly controlled, simulated signals with descriptions of overall specific absorption rates (SARs) are suited to the assessment of temperature rises in cells or tissues. Real signals make it more difficult to measure average energy, but have characteristics which controlled, simulated signals lack. The complex field patterns, with variable peak field strengths and intervals between transmissions, may influence biology in ways that controlled, simulated patterns cannot, but they are not represented by time-averaged, duty factor reductions of described energy absorption. Responses to RF fields can be greater for intermittent exposures than continuous

(15, 16) and depend upon the pulse characteristics for the same average power (17). Effects can be dependent on frequency, modulation, signal strength (intensity windows), durations of exposure and polarisation (18, 19). For the nervous system, complex signals from real devices may modulate neuronal activity, similar to endogenous electric field ephaptic (non-synaptic) coupling in the brain (20). There is evidence that endogenous electric fields feedback to modulate neuronal activity (21). Fields with amplitudes similar to those found in vivo, applied to neocortical brain slices, modulated and entrained neuronal spiking activity (21). Irregular patterns of fields with complex dynamics, which mimicked in vivo fluctuations, entrained neuronal activity more strongly than sine waves (21). There are valid reasons for testing the effects of signals from real mobile devices, and dismissing these limited and misrepresented the evidence.

The summary for neurocognitive effects in humans stated, "*Studies of cognitive function and human performance do not suggest acute effects of exposure to RF fields from mobile phones and base stations*" [page 226 (2)]. But acute detrimental effects on cognition were omitted from the report (22–25) or mentioned in different sections (26–29). Increased errors during a memory task (26), slowed performance (27) or decreased accuracy in a cognitive test (28) were reported in the electroencephalogram (EEG) section [pages 209–213 (2)]; slowed performance in cognitive tests (29) were reported under sleep [page 215 (2)]. Omitting the studies which found effects in the relevant section led to an incorrect conclusion.

For symptoms in humans, "*Sufferers differ in terms of the type of symptoms that they report, the speed with which symptoms develop and the types of electromagnetic field that appear to be problematic*" [page 232 (2)]. Acute provocation studies in humans expose all subjects to the same short electromagnetic signal to see whether they all respond with the same immediate symptoms. If the speed with which symptoms develop and types of trigger differ between individuals, then in a group overall a lack of significance might be expected for identical acute provocations, but this does not mean that some individuals cannot respond to certain fields given adequate exposure durations, intervals between provocations and low background electromagnetic fields, as has been reported (30, 31). The executive summary concluded, "*The evidence suggests that RF field exposures below guideline levels do not cause acute symptoms in humans*" [page 3 (2)], without explaining limitations.

Many of the longer-term observational studies described significant associations of RF exposures with symptoms, albeit with limitations in study designs: "*While some, though by no means all, of the studies reviewed above appear to suggest an association between mobile phone use and symptoms...*" [page 245 (2)], followed by "*almost all of the studies share a fundamental methodological problem which makes it difficult to draw any firm conclusions from them: these studies relied upon the participants' own descriptions of their mobile phone usage as the exposure variable for their analysis and on self-description of symptoms while knowing exposure status*" (2). Longer-term studies on symptoms were omitted from the executive summary.

No mention was made of the World Health Organization (WHO) International Agency for Research on Cancer (IARC) classification of RF fields as a possible human carcinogen in 2011, which was based on limited evidence supporting carcinogenicity below ICNIRP guideline values (32).

(b) Evidence dismissed and ignored in conclusions

For in vitro membrane effects, the report showed that all studies included (seventeen (33–49); non-blood-brain barrier (BBB)) described significant responses to RF signals except for one, which had tested extremely high powers, far greater than ICNIRP guidelines, that heated the tissue [250–3600 W/kg time-averaged SAR (50); pages 102 and 103 (2)]. This heating study had reported an effect, an in vitro recoverable decrease in population spike amplitude in the hippocampus in response to the RF signal, but no effect on long-term potentiation (50). The report text also mentioned that Falzone et al. had found no changes to the cell membrane [(51), page 101 (2)], but they had measured markers of apoptosis, programmed cell death, not direct effects on membranes; this paper was not included in the table of studies on membrane effects. The membrane studies were weakly dismissed: "*In general, most studies report finding effects on cell membranes when exposures are made at mobile phone frequencies. However, the effects reported are varied and, although the majority find effects, neither is this unanimous nor does it necessarily provide supporting evidence of a consistent effect. The variety of cellular systems and exposures makes comparisons of the effects on the cell membrane problematic and without independent replication it is difficult to assess the robustness or even the validity of the findings.*" Studies had looked at a range of effects and all, below high power heating, reported significant changes, strengthening the validity of the findings.

For direct effects on proteins, 15 out of 16 studies listed found significant effects of RF fields [pages 103–105 (2); (52–67) effect; (53) no effect]. The conclusion was "*In general, most of the studies that have investigated changes*

in protein function or structure due to exposure to RF fields have found effects. However, at the present time the effects have not been demonstrated to be robust by independent replication; so although the concept of a direct effect of RF field exposure on protein structure is interesting, further research is needed to establish if this is a real phenomenon." Ninety-four percent of the studies listed on direct effects on proteins, from 14 different groups, found significant effects, but the conclusion was turned around to imply that these may not be real.

"*Where replications have been undertaken they do not support the original findings. This continued lack of robust evidence makes the possibility of an effect of RF fields on cells more unlikely*" [page 105 (2)]. An effect on cells is not unlikely when there were significant effects in all of the relevant studies on membranes (excluding BBB), all of the studies except one on direct protein effects, the majority of the studies on oxidative stress or male fertility, all of the included in vitro genotoxicity studies on epithelial cells [see c; page 84 (2)] and 47% of in vitro genotoxicity studies which could have been included in the report (see c; SI).

"*Studies on cell membranes and direct effects on proteins mostly found effects of RF field exposure. However, no conclusions can be made as there are no common patterns of exposure conditions or types of effects caused by the exposure*" [page 106 (2)]. Out of 33 studies on direct effects on proteins or cell membranes, 32 described significant effects of RF signals below high power heating, but these disappeared in the conclusions.

By the end of the report, the conclusion on cellular studies had incorrectly become "*There are now several hundred studies in the published literature that have looked for effects on isolated cells or their components when exposed to RF fields. None has provided robust evidence for an effect*" [page 318 (2)].

A summary for human brain EEG recordings stated, "*the EEG studies published since 2003 do provide some evidence that RF fields could influence brain function, and this should remain an area of interest*" [page 226 (2)]. Many EEG studies (awake or asleep subjects) reported changes in electrical field potential oscillations, evoked responses or interhemispheric coupling, but these were dismissed: "*it remains unclear whether these RF effects, if they exist, are material to human health or not*". Electrical field potential oscillations can synchronise activity of local networks (21) or propagate signals over large regions, controlling brain developmental processes, including neurogenesis, apoptosis, neuronal migration, differentiation and network formation (68). Oscillations have been linked with active processing or inhibition of cognitive functions (69) and cyclic modulations of neuronal excitability (21). References available at the time of the report describing behavioural problems (70–72) and changed psychomotor performance (73) associated with pre-natal or childhood RF exposures, cell death and reduced cell numbers in the brain (74–83) and cognitive inhibition (22–29, 78, 79, 84–88) supported the possibility that RF-induced changes in electrical activity could contribute to altered brain development or cognition.

The executive summary included "*There has been no consistent evidence of effects on the brain, nervous system or the blood-brain barrier, on auditory function, or on fertility and reproduction*" [page 3 (2)]. The term 'consistent' dismissed areas for which the majority of studies had found adverse effects, such as male fertility. Of the studies included in the report on pregnancy and development, which quantified effects of pre-natal or early neonatal RF exposures on neuronal cell numbers in the developing brain [pages 184–187 (2)], four found significant decreases: pyramidal cells in the rat hippocampus (74), granule cells in the rat dentate gyrus (75), Purkinje cells in the mouse cerebellum (76) and a transient increase in neurogenesis of the subventricular zone following 8 h of RF exposure over 2 days, but a long-lasting decrease in neurogenesis following a 24 h exposure over 3 days (77), measured from proliferating cells in the rat rostral migratory stream. One study described no effect on neuronal numbers in the mouse hippocampus (89). Whilst not all reported effects, the studies supported RF exposures decreasing neuronal numbers in the brain during pre-natal and early neonatal development at least in some circumstances (74–77). The executive summary misleadingly implied that because not all studies reported the same effects, RF signals have no effect.

The AGNIR report suggested that symptoms in humans may be caused by people's perception of being exposed, rather than the actual electromagnetic fields [page 246 (2)]. Imagining a signal to be present is unlikely to explain all responses, particularly symptoms reported in response to RF signals under blind or double-blind conditions (30, 31, 90). Many other studies support biological responses being related to the electromagnetic signal, including evidence from cultured cells, in vitro preparations, animals, plants or asleep humans, none of which reacted with significant changes because they imagined that RF signals were present. That living things can respond to low power RF signals is now supported by a large body of research.

(c) Incorrect statements

For child development [page 260 (2)], maternal mobile phone use during pregnancy was associated with

behavioural problems in children at the age of 7 (70, 71) and lower psychomotor performance was described for children of mothers who had the highest mobile phone use during pregnancy (73). The report said, "*these results are only suggestive of an effect, rather than being conclusive evidence of one*". Increased conduct problems were reported in 8–17-year-olds with the highest quartile of RF exposures (72) [page 250 (2)]. As studies suggested an effect on child development, the executive summary incorrectly stated, "*data on other non-cancer outcomes show no effects of RF field exposure*" [page 4 (2)].

For risks of brain tumours or acoustic neuromas in humans, "*the similar results of all investigators except the Hardell group, with no methodological inferiorities in these other investigators' studies overall, suggest that the results of the Hardell group are the problematic ones*" [page 308 (2)]. However, some significantly increased risks of brain tumours or acoustic neuromas were described in Hardell and non-Hardell studies [pages 282–306 (2), (91)], although non-Hardell significant data were omitted from the data tables and only mentioned in the text. For example, for gliomas with an ipsilateral mobile phone use of ≥ 1640 cumulative hours (ages 30–59), the international Interphone study reported a significant odds ratio (95% confidence interval) of 1.96 (1.22–3.16) and Hardell et al. reported a significant odds ratio of 2.32 (1.14–4.73) (91). Had the data tables included results for ipsilateral exposures, duration of use and more detail of the pooled Interphone studies, it would have been clearer that significantly increased risks had been reported. "*With no methodological inferiorities in these other investigators' studies*" was incorrect. The Interphone study did not take cordless phone use into account in the analysis for mobile phones (91); the Danish cohort study misclassified corporate mobile phone users as non-users, as well as those who took subscriptions out after 1995 (92).

The comment in the executive summary, "*the accumulating evidence on cancer risks, notably in relation to mobile phone use, is not definitive, but overall is increasingly in the direction of no material effect of exposure*" [page 4 (2)], was misleading. Significant risks were most common for ipsilateral exposures, latencies of 10 years or more since first use or the highest cumulative hours of use (2), (91). If anything, as use increased, the evidence increasingly pointed towards possible risks.

The executive summary stated for cells in vitro: "*In particular, there has been no convincing evidence that RF fields cause genetic damage or increase the likelihood of cells becoming malignant*" [page 3 (2)] and in the chapter on cellular studies: "*Results from studies using other cell types are also contradictory. Epithelial cells exposed to ...*" [page 86 (2)]. However, all in vitro studies included on epithelial cells [four, one retracted, page 84 (2), (93–95)], from more than one laboratory, found damage to DNA or chromosomal aberrations in response to RF signals. Forty-six percent of genotoxicity studies identified as included in the report (36 out of 78; SI) described evidence for genotoxicity in response to RF fields, but at least 40 genotoxicity studies were omitted (SI). If these had been included, 52% (61 out of 118) of genotoxicity studies overall and 47% of in vitro (36 out of 76) would have described evidence for genotoxicity (SI; AGNIR restriction to the English language; identified from PubMed and EMF-Portal databases). AGNIR found the genotoxicity evidence unconvincing, but a more accurate conclusion could have been that RF signals appear to be genotoxic under certain circumstances, but not others.

For the immune system [page 174 (2)], a Russian study was included (96), which mostly replicated earlier Russian studies and a French one which did not (97). The conclusion was "*it is clear that the results of the original Soviet studies have not been confirmed*". It was not clear, as the report also referred to the Russian study with "*These results do not appear to be identical to the original, although they do show the same tendency. Results of ELISA reinforced this conclusion. Grigoriev and colleagues also reported that very few pregnant animals receiving serum from exposed animals gave birth to live animals (4 out of 12), which is also supportive of the previous results*".

The report described cognitive performance of RF-exposed and sham-exposed Alzheimer's disease-like transgenic mice (98) [pages 144–147 (2)]. However, there were no shams in the study, as controls were housed in a separate room without a Faraday cage; exposed mice (two 1 h exposures per day, 918 MHz, SAR 0.25 W/kg) were continuously housed within a Faraday cage for up to 9 months (98). Cognitive improvements in the exposed groups compared to controls may have been the result of long-term protection from environmental electromagnetic fields by the Faraday cage. Because background man-made electromagnetic fields may alter experimental results and are often present in experimental environments, they ought to be described in the Methods section for all biological studies, but are often omitted, as in this paper. The AGNIR report conclusions [page 318 (2)] described this as a well-performed study, whilst other effects of RF signals on cognition were dismissed as inconsistent. Varied responses might indicate dependency upon physiological or experimental conditions and do not automatically justify ignoring evidence.

Conclusions

Decisions about involuntary, continuous and widespread RF exposures in schools, hospitals, workplaces and public and private spaces in the UK and around the world have been made based upon inaccurate conclusions of the AGNIR report. Published in 2012, it continues to be used to justify RF exposures and dismiss concerns about possible adverse effects on health, well-being or development.

The denial of the existence of adverse effects of RF fields below ICNIRP guidelines in the AGNIR report conclusions is not supported by the scientific evidence. Studies have, as described as examples in this review, reported damage to male reproductive health, proteins and cellular membranes, increased oxidative stress, cell death and genotoxicity, altered electrical brain activity and cognition, increased behavioural problems in children and risks of some cancers. For future official RF reports, it is important to check that conclusions accurately reflect available evidence before decisions which impact on public health are made based on the executive summary and overall conclusions.

The involvement of ICNIRP scientists in the misleading report calls into question the basis and validity of the international exposure guidelines. To protect public health, we need accurate official assessments of whether there are adverse effects of RF signals below current international ICNIRP guidelines, independent of the group who set the guidelines.

The anticipated WHO Environmental Health Criteria Monograph on Radiofrequency Fields, due in 2017, is being prepared by a core group and additional experts (99), with 50% of those named, being, or having been, members of AGNIR or ICNIRP (Table 2). Considering the importance of the Monograph for worldwide public health and the inaccuracies described here, independence from AGNIR would increase confidence in the report findings. Independence from ICNIRP is necessary to remove the conflict of interest when effects below ICNIRP exposure guidelines are being assessed.

Schools, hospitals, employers, organisations and individuals have legal responsibilities to safeguard the health, safety, well-being and development of children, employees and members of the public. But they are unable to fulfil their legal responsibilities when they have been provided with inaccurate information and the evidence of possible harm has been covered up.

Individuals and organisations who/that have made decisions about the often compulsory exposures of others to wireless RF communication signals may be unaware of the physical harm that they may have caused, and may still be causing, because they have not been accurately informed of the risks. This has been a safeguarding failure and the health of some children or adults may have been damaged as a result. To prevent further possible harm, restrictions on exposures are required, particularly for children, pregnant women and individuals with medical conditions. All children in schools and care environments need protection from the potential harmful effects of RF exposures and not, as is now often the case, a compulsory use of wireless devices in the classroom. Children may unjustly face losing their human right to an education if they do not want to absorb RF fields every day at school and no alternative environments are available. Attention also needs to be given to the provision of safe working environments for employees and safe public spaces, particularly where exposures are involuntary.

PHE and AGNIR had a responsibility to provide accurate information about the safety of RF fields. Unfortunately, the report suffered from an incorrect and misleading executive summary and overall conclusions,

Table 2: Named contributors to the WHO Environmental Health Criteria Monograph on Radiofrequency Fields [(99), in preparation] and membership of ICNIRP or AGNIR.

Core group	
Feychting M.	Vice-Chair ICNIRP, AGNIR
Mann S.M.	ICNIRP, AGNIR
Oftedal G.	ICNIRP
van Rongen E.	Chair ICNIRP
Scarfi M.R.	
Zmirou D.	
Additional experts	
Aicardi G.	
Challis L.	Formerly AGNIR
Curcio G.	
Hug K.	
Juutilainen J.	ICNIRP
Lagorio S.	
Loughran S.	ICNIRP
Marino C.	ICNIRP
McNamee J.	
Naarala J.	
Peyman A.	AGNIR
Röösli M.	ICNIRP
Rubin G.J.	AGNIR
Schoemaker M.	
Selmaoui B.	
de Sèze R.	ICNIRP
Sienkiewicz Z.J.	ICNIRP, AGNIR
Simko M.	
Vijaylaxmi	
Zeni O.	

inaccurate statements, omissions and conflict of interest. Public health and the well-being of other species in the natural world cannot be protected when evidence of harm, no matter how inconvenient, is covered up.

Conflict of interest statement: The author states no conflict of interest.
Ethical approval: The conducted research is not related to either human or animal use.

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Supplementary Material: The online version of this article (DOI: 10.1515/reveh-2016-0060) offers supplementary material, available to authorized users.

Exhibit No. 4

Job Accommodations for People with Electrical Sensitivity

JAN – Job Accommodation Network

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Practical Solutions ○ Workplace Success

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JOB ACCOMMODATIONS FOR PEOPLE WITH ELECTRICAL SENSITIVITY

Electromagnetic sensitivity, also known as electromagnetic hypersensitivity, electrical sensitivity, electro-magnetic sensitivity, and idiopathic environmental illness (IEI), has been difficult for the environmental health and medical communities to define. Individuals with electromagnetic sensitivity may experience various non-specific symptoms including but not limited to fatigue, weakness, neurological issues, immunological issues, gastrointestinal issues, increased irritability, lack of ability to think clearly and quickly, sleep disturbance, overall malaise, and anxiety.

Individuals with electromagnetic sensitivity typically report managing symptoms by avoiding exposure to electromagnetic fields (EMFs) that trigger their symptoms. They often make modifications to their homes and daily routines to minimize exposure through avoidance of EMFs and reduce their overall long term exposure to EMFs. When it is not possible to avoid it, then limiting duration and strength of exposure and use of shielding may also be useful. Based on data from JAN calls, common workplace issues involve exposure to Wi-Fi, cell phones, and computer equipment such as CPUs and monitors.

According to a review of literature by Martin Röösli 2007[1], a causal relationship between short term exposure to EMFs and elicitation of symptoms has been challenging to substantiate under laboratory conditions. However, population based studies involving longer term exposure have shown correlation between long term exposure and symptoms such as headache, cold hands or feet, and concentration difficulties. Research on this topic is ongoing.

The National Institute for Occupational Safety and Health (NIOSH) and the Centers for Disease Control and Prevention (CDC) have published guidelines for "safe" levels of human exposure in a publication called, Manual for Measuring Occupational Electric and Magnetic Field Exposures. However, the nature of electromagnetic sensitivity is such that even levels that are deemed safe for the general public can cause trigger symptoms for individuals who are hypersensitive. Individuals affected by electromagnetic sensitivity experience symptoms at far lower levels and therefore may need accommodations in the workplace beyond the safe levels of exposure indicated in the manual.

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[1] Science Direct Environmental Research 107 (2008) 277–287 Radiofrequency electromagnetic field exposure and non-specific symptoms of ill health: A systematic review Martin Röösli Institute of Social and Preventive Medicine, Department of Social and Preventive Medicine, University of Bern, Finkenhubelweg 11, CH-3012 Bern, Switzerland Received 21 September 2007; received in revised form 4 February 2008; accepted 6 February 2008 Available online 21 March 2008 Retrieved 2/12/2015

Organizations such as the World Health Organization (WHO) and the United States Access Board, which offers technical assistance on the ADA Accessibility Guidelines, have issued statements and regulatory guidelines related to electrical sensitivity. The World Health Organization (WHO) held an international workshop on the issue in Prague, Czech Republic, in 2004. WHO recognizes that a significant number of people report symptoms after exposure to electromagnetic radiation that range from neurological and immunological to gastrointestinal issues (WHO, 2005). The Access Board addressed electromagnetic sensitivities as part of the IEQ Indoor Environmental Quality Project.

The following is a quick overview of some of the job accommodations that might be useful for people with electrical sensitivity. For a more in depth discussion, access JAN's publications at http://AskJAN.org/media/atoz.htm. To discuss an accommodation situation with a consultant, contact JAN directly.

General Accommodation Considerations

- Allow communication via typewriter or handwritten notes rather than via computer or cover the computer with Plexiglas or other shielding material.
- Provide headset/handset extenders or alternate headsets to lengthen the distance between devices that trigger symptoms and the employee's body.
- Change the employee's shift to allow for less exposure to others' devices.
- Relocate workplace away from areas where symptoms are triggered. This may include limiting certain types of devices in the vicinity of the employee's workstation.
- Allow telework (Note: regarding work at home, unless the employee wants to work at home, other options should be explored first to keep the employee in the workplace).
- Allow the employee to meet with others in areas where triggers are minimized or allow remote access to meetings or activities that must take place in areas that trigger symptoms.
- Provide wired telephones and network connections.
- Provide building-wide and/or workspace shielding of equipment and devices, for example add filters to fluorescent lights and tape electrical cords.
- Individuals with electrical sensitivity may also experience limitations from fragrance sensitivity and/or photosensitivity.

Updated 04/28/15

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Exhibit No. 5

2008 Pennsylvania House & Senate Journals

Excerpts from appropriate pages

HB2200 Discussion – Smart Meters NOT Mandatory

Excerpts from 2008 PA House and Senate Journals

HB2200 Did NOT Mandate Smart Meters

Note PA State Senator Mr. Fumo's statement October 8, 2008

In addition, we did not mandate smart meters, but we made them optional. We did say in new construction, where they really are practical, they will be put in.

February 11, 2008 House Journal pp. 386-403
PN3218, p.391
PA State Rep. Mr. Freeman
Well, I would only point out, Mr. Speaker, that we are requiring the utility company to install the meter, not the customer, and it is the utility company.

PA State Rep. Mr. Godshall

[....] What I am not in full agreement on in any way is that everyone is mandated to, whether they intend to use it or not, whether they know how to use it or not, everyone is mandated, under this legislation, to go ahead with the smart meter technology.

[....], but then if there was a question at the bottom that says you are going to be paying $300 for the installation through your utility bill for this meter and the software that goes with it, I am not sure what the answer would be.

PN3218, p.393
The Speaker says, The Chair recognizes the minority leader, **Representative Smith**, who says.

If we really want to encourage people to use it, I think we ought to allow them to engage it themselves as opposed to forcing them to pay for something they may not use, and that is really the difference, Mr. Speaker, in what I think is right or wrong with the amendment. While I certainly appreciate the direction it is trying to go, I think the fact that it forces the cost of the meters onto every consumer of electricity in Pennsylvania, I think that is the wrong direction to go and would ask for a vote against the amendment.

PA State Rep. Mr. Saylor says,

Mr. Speaker, I want to make it clear to everybody, this is a mandate. **This is not voluntary; it is a mandate required to use smart meters in Pennsylvania. [....], the choice is up to the consumer to use that technology and whether they want that smart meter installed on their house. The key is, should we in the General Assembly mandate something on consumers that is going to cost them more dollars in their electric bill?**

Continued on Page 2

This issue in particular should be a choice by consumers, not a mandate by the General Assembly onto an additional cost to electric bills in Pennsylvania. So remember, voting for this amendment, while I think it has great goals and where the gentleman wants to get to is very admirable and where we need to get to at some point in time, **it still needs to be a consumer choice, not a General Assembly mandate onto consumers that is going to cost them more in their electric bills.**

PN3218, p.395
PA State Rep. Mr. Benninghoff

I guess my reservation, obviously, is do we want a statewide mandate? Do we want the government telling you that you have to have a meter put in your property? [....] **I think it is important that we are smart about our energy use, but I also think we have to think about what government's role is in mandating such a thing.**

PN3218, p.397
PA State Rep. Mr. Gabig

The problem I am having with the amendment is [....] **But if they start saying, well, for the smart legislator you are going to pay five times more money and for the dumb legislator you are going to pay five times less money, for the smart card you are going to pay five times more money and for the dumb card you are going to pay five times less money, for the smart meter you are going to pay we do not know how much more money because we will not tell you, but it is not going to be the utilities that pay for it because we took care of them in our amendment; they are taken care of in this Freeman amendment. The big utility companies and corporations, they are all right with it; they support this, but the customer, well, you are going to pay the freight for this mandate, this State mandate**

February 12, 2008 House Journal, pp. 430-432
PN3233 Pg. 431
PA State Rep. Mr. Hutchinson

Mr. Speaker, I rise in opposition to passage of HB2200, and let me tell you why. I believe in its original unamended form, before it came to the House floor, there were a lot of redeeming qualities in the bill. It did promote conversation, and that is a laudable goal for Pennsylvania, to try to conserve energy.

However, by the amendments passed yesterday, which mandated universal smart meters across Pennsylvania, that is a fatal flaw that makes this bill a bad idea for Pennsylvania. It is bad for the consumers of Pennsylvania who will have to pay for those smart meters, whether they save on their electric bills or not. It makes no sense whatsoever to force people to pay for those smart meters and then, in addition, still pay higher and higher

Continued on Page 3

utility bills. It was said yesterday that if only 1 percent of the people used smart meters, we would have huge savings in energy use in Pennsylvania, and, Mr. Speaker, I agree with that statement. But my idea is, let us get the smart meters only to those 1 percent of the people and get this same savings in energy use. That is the smart way to move forward to promote energy conservation, to use technology like smart meters in a targeted and commonsense way instead of a mandated, across-the-board consumer tax – that is what it is, a couple hundred dollars per person – that will have to be paid to pay for these smart meters. So after adding that fatal flaw to this bill, I think it is incumbent upon everyone in this chamber to vote against HB2200, and I ask them to join me in that vote. Thank you, Mr. Speaker.

HB2200 made its way through the PA House and went to the Senate for their consideration and more amending.

PN4429
(2) **Electric distribution companies shall furnish smart**

28 **meter technology as follows:**
29 **(I) Upon request to a customer that agrees to pay**
30 **the cost of the smart meter.**
1 **(II) In the construction of a new residence or new**
2 **building to be used by a commercial customer.**
3 **(III) In accordance with a schedule of replacement**
4 **of full depreciation of existing meters.**

PN4526
(2) **Electric distribution companies shall furnish smart**

23 **meter technology as follows:**
24 **(I) Upon request from a customer that agrees to pay**
25 **the cost of the smart meter at the time of the request.**
26 **(II) In new building construction.**
27 **(III) In accordance with a depreciation schedule not**
28 **to exceed 15 years.**

October 8, 2008 Senate Journal, pp. 2626-2631
PA State Senator Mr. Tomlinson (p.2626)

Mr. President, I rise to ask for support for House Bill No. 2200 as amended by the Senate. [....] It also contains language in there that we will have smart meters. **It is not mandated, but it allows for the deployment of smart meters through a depreciation process, through new home construction process, and through the depreciation of 15 years, and for anyone who wants to purchase a smart meter which they feel will help them manage their electric load better.**

Continued on Page 4

Question: So, why are PECO and other utility companies sending out shut off notices to customers who don't want them and don't have to have them in accordance with the above statement by State Senator Tomlinson? Apparently, utility companies are not abiding by the law, or its proper interpretation as written, as these discussions of the bill and amendments document.

PA State Senator Mr. Boscola

So-called smart meters by themselves are not magically – anyone's monthly electric bill is not going to go down just because you are getting a smart meter. That will not happen. [....] **We also made sure that smart meters would not be mandated for every single ratepayer. Not only is that a smarter approach to smart meter deployment, but it will also save electric customers hundreds of millions of dollars paying for something that will not provide a real benefit in their own households.**

PA State Senator Mr. Fumo

In addition, we did not mandate smart meters, but we made them optional. We did say in new construction, where they really are practical, they will be put in.

Smart Meter Procurement and Installation Implementation Order was adopted at the June 18, 2009 Public Meeting. Entered June 24, 2009. Docket No. M-2009-209655.

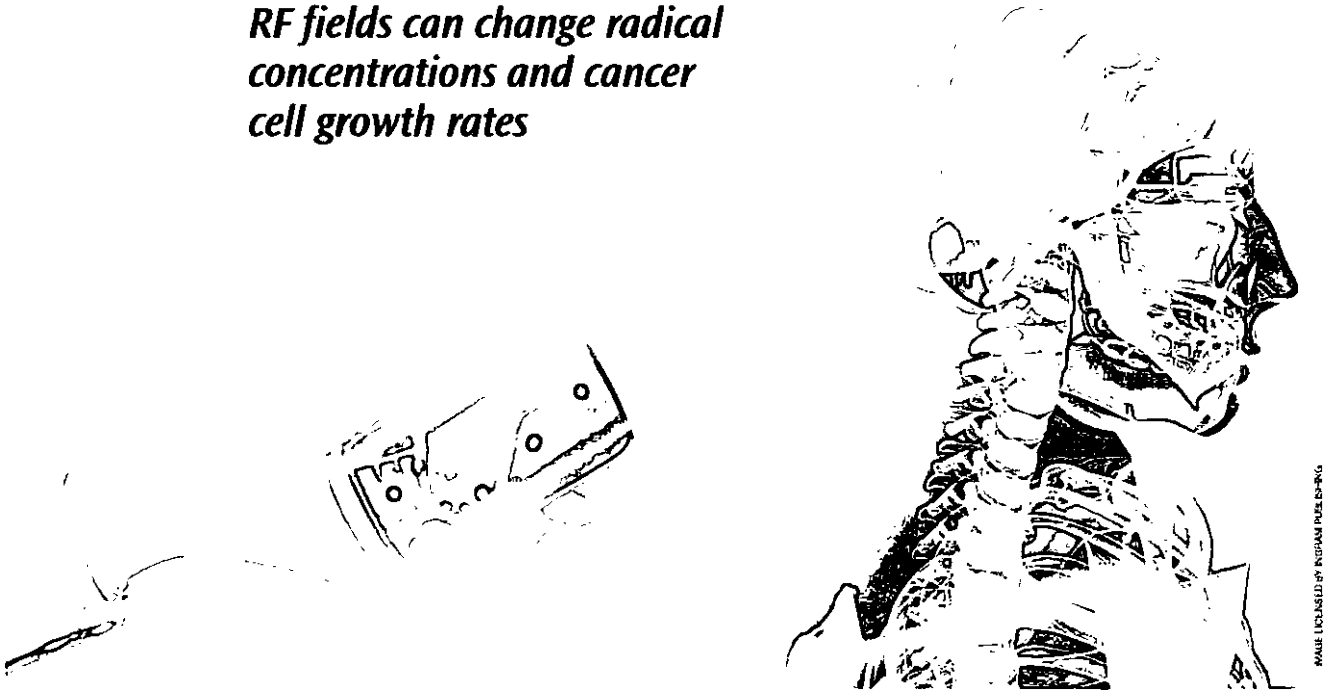
The Commission ***believes*** that ***it was the intent of the General Assembly*** to require all covered EDCs to deploy smart meters system-wide when it included a requirement for smart meter deployment "in accordance with a depreciation schedule not to exceed 15 years."

Exhibit No. 6

Some Effects of Weak Magnetic Fields on Biological Systems

Some Effects of Weak Magnetic Fields on Biological Systems

RF fields can change radical concentrations and cancer cell growth rates



by Frank Barnes and Ben Greenebaum

Concerns have been raised about the possible biological effects of nonionizing radiation since at least the late 1950s with respect to radar, other radio, and microwave sources. More recent concerns have arisen about the potential effects of low-intensity fields, including low-frequency fields from the electric power generating, transmission, and distribution system and the devices it energizes, as well as intermediate, radio-frequency (RF), and higher-frequency radiation from devices such as cell phones, broadcast antennas, Wi-Fi, security monitors, and so forth. These are concerns about the direct effects of radiation on humans or other organisms. They are distinct from the electromagnetic compatibility issues that concern interference by the fields from one device with the function of another, though human health can be indirectly affected by electromagnetic interference with the function of medical devices, including hospital equipment or pacemakers.

Because of the difficulties in establishing the direct biological effects of long-term low-level exposures, the lack of an understood mechanism, and difficulties in obtaining reproducible results, the guidelines for exposure limits have

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been set based on relatively short-term exposures (minutes) that show clear-cut damage with the addition of a substantial safety factor. The current guidelines from the U.S. Federal Communications Commission (FCC) for limiting exposures in free space to the general public for the frequency range 100 kHz–100 GHz are given in Table 1. These guidelines are based on American National Standards Institute (ANSI) and IEEE recommendations. For cell phones, the specific absorption rate (SAR) is limited to 1.6 W/kg averaged over 1 g of tissue. These limits have been set based on providing a significant safety factor over exposure levels known to cause damage, where the primary damaging mechanism is heating and an increase in temperature. At low frequencies, the limits are based on induced current densities that would excite nerve firing, and the permissible exposures recommended by IEEE C95.6 are shown in Table 2. The International Commission on Nonionizing Radiation Protection (ICNIRP) sets electric field exposure limits at 50 Hz to 5 kV/m and magnetic flux density limits at 100 μT. It also sets guidelines for general public exposures in the frequency range 3 kHz–10 MHz at $E = 83$ V/m, $B = 27$ μT and a whole-body SAR = 0.08 W/kg, and 1.6 W/kg over 1 g.

Damages, such as aging, cancer, and Alzheimer's, are associated with radical concentrations that are elevated for extended periods of time.

In general, environmental exposures at any frequency do not exceed these guidelines, especially for the general public. Instances of occupational exposures approaching or exceeding the guidelines are less uncommon [1]. However, the time constants for cell growth cycles and many other growth phenomena are often hours or days. The most favored proposed mechanism for effects from low-level, long-term exposures involves radicals, such as super oxide $O_2^{-\bullet}$, NO_x, and H_2O_2, which is readily converted into the radical $OH^{\bullet}$, molecules with unpaired electron spins that are highly reactive. These molecules are both signaling molecules and molecules that can cause damage to important biological molecules, such as lipids and DNA. Damages, such as aging, cancer, and Alzheimer's, are associated with radical concentrations that are elevated for extended periods of time [2]. In this article, we present the possible theoretical mechanisms and experimental data that show long-term exposures to relatively weak static, low-frequency, and RF magnetic fields can change radical concentrations. As a consequence, a long-term exposure to fields below the guideline levels may affect biological systems and modify cell growth rates, while an organism's built-in mechanisms may compensate for these changes.

Background

Much of the public concern dates from epidemiological studies that show small, though statistically significant increases in childhood leukemia for children living near power lines and possible increases in brain tumors for heavy use of cell phones. The early study by Wertheimer and Leeper [3] has shown an increase that was just statistically significant in childhood leukemia for children living near power lines. Of the many additional studies since then,

Table 1. The FCC limits for maximum permissible exposure (MPE).

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (H) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|H\|^2$, $\|H\|^2$ or S (min)
0.3–3	614	1.63	(100)*	6
3–30	1842/f	4.89/f	($900/f^2$)*	6
30–300	61.4	0.163	1	6
300–1,500			f/300	6
1,500–100,000			5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (H) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|H\|^2$, $\|H\|^2$ or S (min)
0.3–1.34	614	1.63	(100)*	30
1.34–30	824/f	2.19/f	($180/f^2$)*	30
30–300	27.5	0.073	0.2	30
300–1,500			f/1,500	30
1,500–100,000			1	30

f = Frequency in MHz

*Plane-wave equivalent power density

Source: OET Bulletin 56, 4th edition, 08/1999, FCC

Table 2. IEEE C95.6 environmental electric field MPEs, whole body exposure.

General Public		Controlled Environment	
Frequency Range (Hz)	*E*–rms* (V/m)	Frequency Range (Hz)	*E*–rms* (V/m)
1–368 [c]	5,000 [a,d]	1–272	20,000 [b,e]

[a] Within power line rights of way, the MPE for the general public is 10 kV/m under normal load conditions.
[b] Painful discharges are readily encountered at 20 kV/m and are possible at 5–10 kV/m without protective measures.
[c] Limits below 1 Hz are not less than those specified at 1 Hz.
[d] At 5 kV/m induced spark discharges will be painful to approximately 70% of adults (well-insulated individual touching ground).
[e] The limit of 20,000 V/m may be exceeded in the controlled environment when a worker is not within reach of a grounded conducting object. A specific limit is not provided in this standard.
*rms = root mean square

about half show small correlations with proximity to power lines and/or weak magnetic fields, and about half do not [4]. However, the possibility that there may be a cause and effect for a long-term exposure to low levels of low-frequency electromagnetic fields has led to the classification by the International Agency for Research on Cancer (IARC), an agency of the World Health Organization (WHO), as a possible cause of cancer. However, this classification has not been included in the International Committee on Electromagnetic Safety or ICNIRP reference levels because of conflicting results and a lack of physical mechanisms by which weak magnetic fields could be expected to modify biological systems. The IARC has published an extensive review of the research epidemiological and laboratory research used in its determination concerning cancer [5]; the WHO has previously published a similar monograph concerning low-frequency field effects and various diseases, including cancer [6].

Although the earliest questions about exposure to high-frequency fields predate the concerns arising from power frequencies, these were generally related to higher-intensity exposures of military personnel or industrial workers. Concerns about more widespread exposures of the general public arose with the advent of the cell phone. Similar to the situation with power frequency fields, there have been many epidemiological studies on RF exposures and, particularly, cell phone use [7]. Among the largest of these is the Interphone study [8]. There have been many challenges to interpretations of the results of this study that no increase in risk of glioma or meningioma was observed with the use of mobile phones. Another view is that the data definitely show an increased risk of brain cancers for individuals with long-term, heavy cell phone use. This report also shows a slightly reduced incidence of cancers for light users. Many challenges to the various conclusions are associated with possible selection bias and the accuracy of the exposure data. Roosli [9] provides detailed discussions of the weaknesses of many epidemiology studies. However, the net result of a review of many epidemiology studies is that there is epidemiological evidence for an association of small increases in cancer rates with long-term exposures to magnetic fields, and the IARC has also classified RF exposure as a possible carcinogen. It has also published a volume summarizing the epidemiological and laboratory RF research related to this finding [10]. The WHO published a 1993 monograph on RF exposure effects and disease [11] and is expected to publish a revision in the near future.

While public concern about the field effects is primarily about adverse health effects, there is also considerable interest in the potential of using either low- or high-frequency fields beneficially. At present, medical uses of electromagnetic fields involve relatively high intensities. For example, RF fields are used for their heating effect in diathermy and ablation of tissues, and pulsed lower-frequency magnetic fields have entered medical practice to encourage healing of recalcitrant bone fractures. A long-term goal of research in this area is to find reliable field effects at lower levels that could be used as noninvasive diagnostic or treatment tools or as research probes of underlying biological processes.

It has long been known that magnetic fields can change chemical reaction rates and radical concentrations. Most of these studies were done with relatively large magnetic fields, 1 mT or greater. Reviews of much of this work have been done by Grissom [12] and Steiner and Ulrich [13]. These reviews show that both changes in nuclear spin states and changes in the angular momentum for electrons in a molecule occur with variations in the magnetic field and affect chemical reaction rates. Some of the earliest work on the effects of nuclear polarizations states on chemical reaction rates of alkyl radicals is described in [14]. This work is followed by numerous papers showing the effects of nuclear polarization and nuclear spin states on chemical reaction rates, including Kaptein [15], Charlton and Bargon [16], Den Hollander et al. [17], and Buchachenko [18]. Woodward et al. [19], among others, find many RF absorption spectra lines in the range 1–160 MHz. Reviews of dynamic spin chemistry by Nagakura et al. [20] and by Hayashi [21] present detailed descriptions of the theory for the conversion of singlet to triplet states for radical pairs and the resulting changes in radical concentrations as a function of magnetic field strength, orientation, and the viscosity of the medium.

Radicals perform a wide variety of biological functions. Reactive oxygen species (ROS), such as super oxide, $O_2^{\cdot-}$, and nitrogen species, such as NO_x, are used both as signaling molecules and to attack bacteria and other pathogens. $O_2^{\cdot-}$ is released by neutrophils to as part of the immune systems response in killing bacteria. NO can activate guanylate cyclase, which results in a rise in cyclic guanosine monophosphate in smooth muscle tissue and vasorelaxation. It is also involved in the activation of macrophages [22]. In addition, the

Concerns about more widespread exposures of the general public arose with the advent of the cell phone.

ion-radical mechanism for the phosphorylation of a very large number of biological molecules is affected by magnetic fields, and phosphorylation is an important step in many biological signaling systems and the activation of biological processes [23].

Our work in this area was triggered by the observation that reducing the Earth's magnetic field to less than 1 μT inhibited the growth of fibrosarcoma HT1080 cells [24] and the theoretical and experimental work by Batchelor et al. [25]. Data from one such experiment involving radicals are shown in Figure 1, and additional work is summarized by Brocklehurst and McLauchlan [26].

A peak value for the concentration of the radical near the Earth's magnetic field with a magnetic flux density range below 1 mT is shown in Figure 1. This result, along with the results given in Figure 2 from [19], shows a large number of resonances in the radical spectra throughout the RF spectrum, provides the theoretical bases by which weak magnetic fields can change radial concentrations.

It is clear from these results that changes in magnetic fields on the order of tens of microtesla can change the concentrations of radicals. We have elaborated on these results to show that one can expect to change radical concentration when magnetic fields are applied at frequencies corresponding to resonances and at level crossings [27]–[29]. Some of these resonances may have narrow line widths corresponding changes in nuclear spin states [30]. In addition, as the static magnetic field (SMF) is varied in

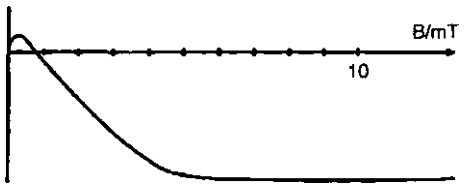

FIG 1 A schematic representation of the experimentally observed field effect in the pyrene/1,3-dicyanobenzene system. At the lowest low-field values, including that of the geomagnetic field, the effect of the field is to increase the proportion of radicals, which survives the geminate period and diffuses into the surroundings, but at high field, the reverse happens. The schematic presentation is used, since the actual published results measured the derivative of the curve, and to display them would introduce an unnecessary complication [25].

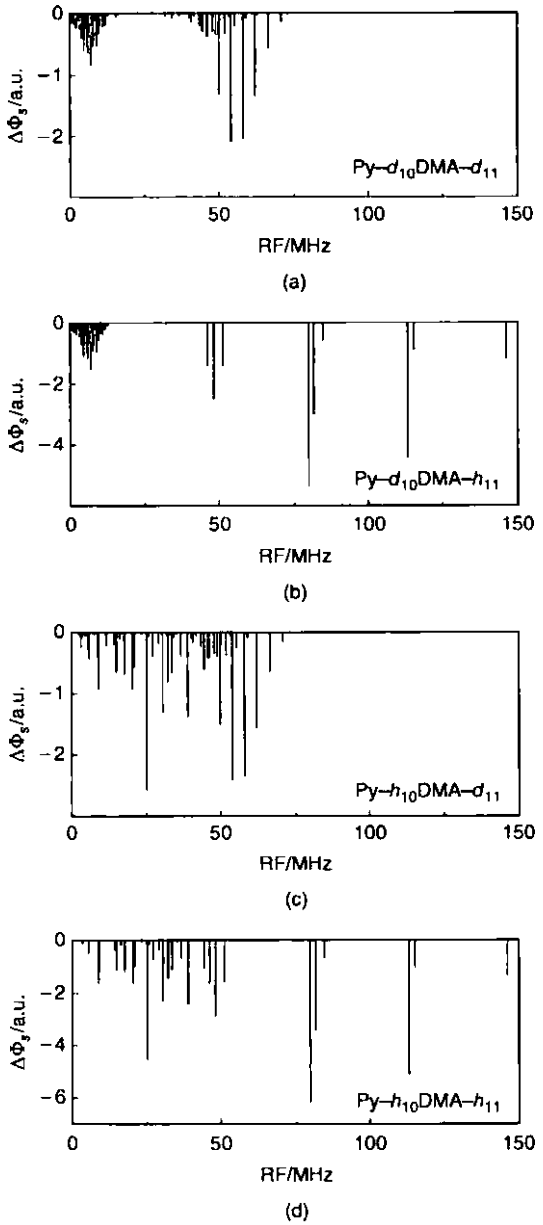

FIG 2 (a)–(d) The RF spectra for pyrene^{-}-N,N-dimethylaniline^{+} (DMA^{+}) [19].

intensity and as the angle between the static and ac magnetic field changes, the recombination rates between the fragments of a radical pair will change [30]. More recent work shows a quantum limit for the detection of weak magnetic fields by changes in chemical reactions using radicals to be on the order of tens of nanotesla [31].

Hypothesis

The proposed hypothesis, which is based on extensive work by others, e.g., [2], [18], [19], [26], and, extended by some of our own [27], is that weak magnetic fields change the rate of recombination for radical pairs that are generated by the metabolic activity in cells, which, in turn, change the concentration of radicals such as $O_2^{-\bullet}$ and molecules such as H_2O_2. Most of the time, the signaling properties of these molecules generate antioxidants and other radical scavengers so that damaging health effects are not seen, and, in some cases, positive effects, such as the activation of the immune system, may be observed. However, long-term exposure to elevated magnetic fields can lead to elevated radical concentrations and an association with aging, cancers, and Alzheimer's. This hypothesis is supported by some theoretical and experimental results. However, because biological systems contain a lot of feedback, feedforward, and repair processes, changes in radical concentrations will often have no observable effects. There is much work that needs to be done to illuminate the conditions in which magnetic fields can lead to either positive health effects or negative health effects, and observable effects may only occur when the exposures are combined with other biological stresses.

Some Theoretical Observations

Radicals are created during many biological reactions, including the metabolic processes in mitochondria. Figure 3 shows a schematic for the formation of a radical pair in either a singlet (S) state, where the spins are aligned with electron spins with opposite spins, or a triplet (T) state, with the spins parallel.

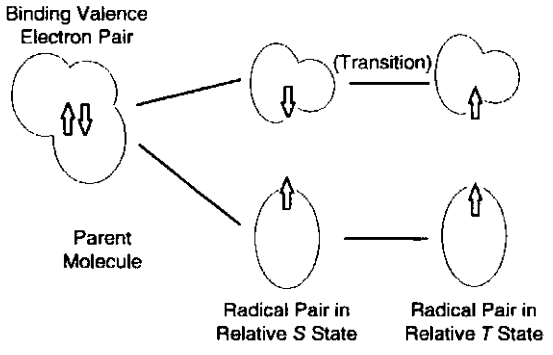

FIG 3 The vector representations of the components of the electron spin, electron angular momentum, and the nuclear spin with respect to the applied magnetic field.

In the singlet state, these pairs recombine with typical lifetimes between 10^{-6} and 10^{-10}s. In the triplet state, they are not allowed to recombine, and the opportunity for them to diffuse away increases so that they can react with other molecules. The coupling between the unpaired electrons and the nuclei in each fragment of the radical pair is different and, typically, can be described by magnetic fields in the range 10 μT–3 mT [26]. For many radicals, this is stronger than the Earth's magnetic field flux density of about 50 μT so that the quantum numbers describing the state of each fragment are determined by the sum F of the electron angular momentum and electron spin J and the nuclear spin I (see Figure 4).

The unpaired electrons in the outer orbit of each of the radical pair fragments can be thought of as rotating about their nuclei at different rates, so the net magnetic

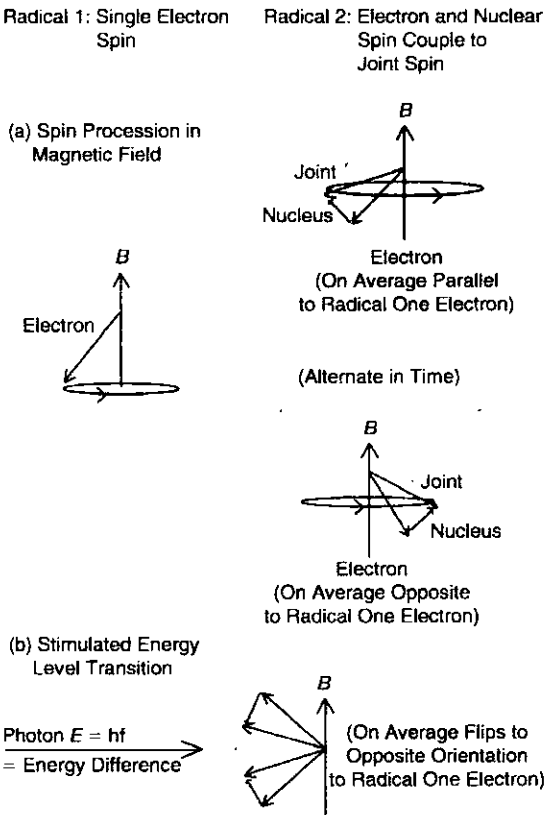

FIG 4 A schematic diagram of evolution of spins of two members of a radical pair, one with only an electron spin and the other with both an electron and a nonzero nuclear spin, illustrating changes between relative S and T states under two sets of conditions. (a) Precession of spins in an external magnetic field. (b) Stimulated transition by absorption of photon of energy corresponding to energy difference between levels in one radical. A photon must also carry angular momentum corresponding to the difference between levels.

moments for the two fragments switch from an S to a T state and back [26]. The rate at which this happens is perturbed by the external magnetic field. The energy levels in each fragment are shifted by different amounts by the external magnetic fields [see Figure 4(a)].

Changes in the applied magnetic field shift the size of the energy barrier for the recombination and the recombination rate. Nuclear magnetic spectra may have very narrow absorption lines with bandwidths of a few cycles with corresponding lifetimes for excited states of seconds or longer. Magnetic fields at the frequency corresponding to differences in the energy levels can drive molecules between energy levels of different nuclear spin states and change the concentration in these energy levels, which, in turn, can change the recombination lifetimes for radial pairs [27], as shown in Figures 4(b) and 5. Note that these narrow line widths can lead to saturation effects with magnetic fields in the range $10^{-8} - 10^{-9}$ T [32]. With large molecules that contain many atoms with nuclear spins, the calculations of the recombination rates are very complex as the contributions to the magnetic field seen by the electron that is active is dependent on the nuclear spin of each atom, its distance from the electron, and the shielding by other electrons in different orbits. For examples, see the calculations in [19], [25], [26], [28], and [33]. For our purposes, we will assume that the sum of these fields is large enough so that coupling can lead to relatively sharp resonances, and the nuclear spin states are important in determining the recombination rates for the radical pairs. Nuclear resonance spectroscopy at radio frequencies shows that nuclear spin states may have lifetimes of seconds or longer and corresponding resonant line widths of a few cycles [30]. We postulate that, in weak magnetic fields, where the magnetic coupling between the active electrons and the nuclei in the radicals is stronger than the perturbing external field, that we will also see shifts in radical concentrations that are frequency and amplitude dependent with relatively narrow line widths [27], as shown in Figure 5. This figure also gives an explanation for effects seen when the ambient magnetic is shielded [37], for then level energy differences are below the natural line widths and spontaneous transitions can occur.

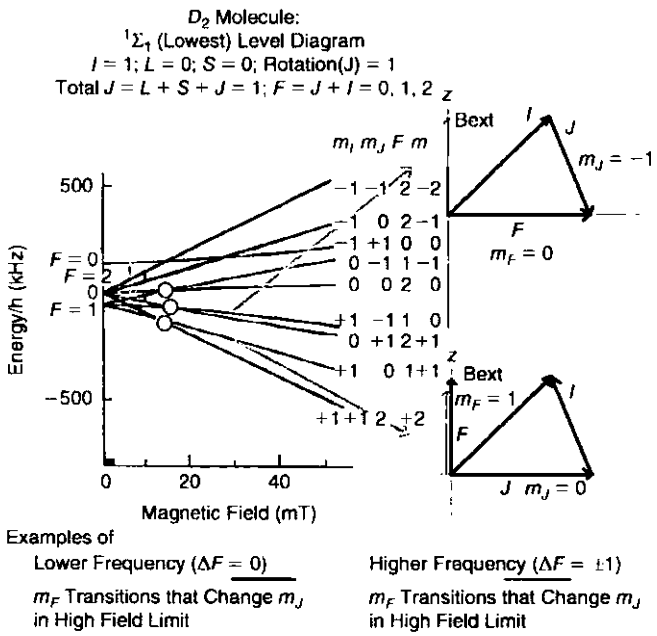

FIG 5 The energies of D_2 molecule states as a function of magnetic field with low field (F, m) and high field (J, m_J, I, m_I). Quantum number labels m_I and m_J are the projections of the electron angular moment and nuclear spin on the external magnetic fields. Note the linearity of curves in low-field region, where $F = J + I$ is a good quantum number, and curvature as well as crossovers as field increases (after Ramsey [29]). Vertical lines (left diagram) indicate allowed transitions. Relative orientations of one transition's upper and lower state angular momenta are shown (right upper and lower diagrams). In the left diagram, circles indicate the examples of possible level-crossing transition points and box on horizontal axis indicates the region of possible zero-field transitions.

Experimental Results

The experiments that most clearly show that weak magnetic fields affect biological processes and radical concentrations are those that involve changes in the SMF. The fact that birds, salmon, and other animals can sense small changes in the Earth's magnetic field and use them for navigation says that biological systems can sense small changes in these fields. Experiments in vitro that show changes in the growth rates of cells are more relevant to potential health effects. The results in reference [24] have shown a reduction in the growth rate of *E. coli* by reducing the SMF below 18 μT. It has also been shown that we can reduce the growth rates of HT1080 fibrosarcoma cells by 20–30% by reducing the SMF to less than 1 μT, while normal fibroblast cell are reduced by less than 10%.

In addition, we have data that show that changes in magnetic field change the growth rate of cancer cells more than normal cells of the same type. Typically, the interior of a a quiescent normal cell is more negative with respect to the exterior than growing cells or cancer cells of the same type. For example, a normal fibroblast cell might have a membrane potential of −70 mV and a fibrosarcoma −30 to −35 mV [34]. Radicals have been shown to modify the channel currents of Na^+,K^+, and Ca^{++} [35]. Preliminary data on fibrosarcoma cells in our lab show both changes in oxidative stress and

Experiments in vitro that show changes in the growth rates of cells are more relevant to potential health effects.

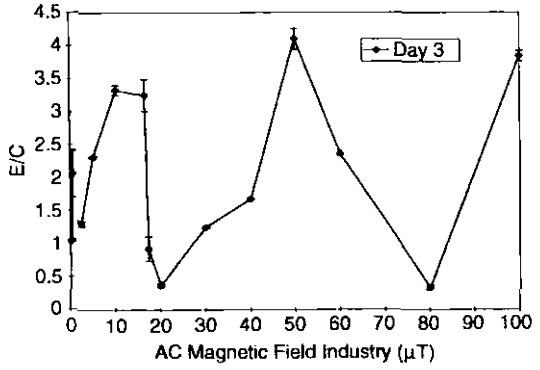

FIG 6 Normalized mastocytoma cell growth at 60 Hz and B_{dc} = 38 μT [38].

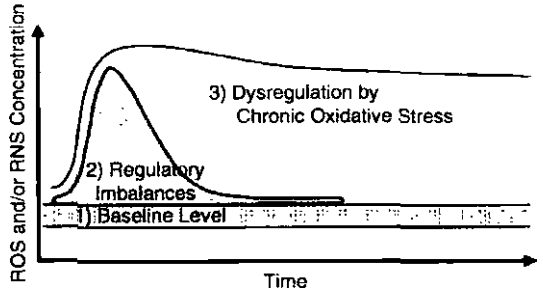

FIG 7 The regulatory events and their dysregulation depend on the magnitude and duration of the change in ROS or reactive nitrogen species (RNS) concentration. ROS and RNS normally occur in living tissues at relatively low steady-state levels. The regulated increase in superoxide or nitric oxide production leads to a temporary imbalance that forms the basis of redox regulation. The persistent production of abnormally large amounts of ROS or RNS, however, may lead to persistent changes in signal transduction and gene expression, which, in turn, may give rise to pathological conditions [2].

membrane potential for changes in magnetic fields from 45 to 100 μT and 200 μT (unpublished results).

At low frequencies, the magnetic fields can both increase and decrease the growth rates of cells. Zmyslony et al. [36] have shown changes in the number of free oxygen radicals in rat lymphocytes in vitro upon the application of weak 50-Hz magnetic fields. Prato et al. [37] have shown a reduction in the pain sensitivity upon exposure to 33 nT at 30 Hz. Bingham [38] has shown both increases and decreases in the growth rates of mastocytoma cells at 60 Hz, as shown in Figure 6. Note that the location of the peaks shift with changes in the SMFs and also with the induced electric fields and the corresponding induced current densities.

Usselman et al. [39] have shown that for rat pulmonary arterial smooth muscle cells, enhanced cell proliferation was observed with continuous applied 45 μT SMF and 7 MHz at 10 μT_{RMS} magnetic fields compared with the control group with only 45 μT SMF. The RF magnetic fields enhanced cellular proliferation by up to 40% on day two and 45% on day three in proportion to the SMF control group, and at three days, it led to a decrease of 45% in $O_2^{-\bullet}$ and an increase in H_2O_2 of 50%. Note that the calculated SAR is estimated to be approximately 0.12 W/kg. Other results [40] have shown that the exposure of HT1080 fibrosarcoma cells to 45 μT SMFs oriented vertical to the plane of growth or to SMFs combined with weak 5- and 10-MHz RF magnetic fields of 10 μT_{RMS} perpendicular to the static field inhibits the growth rate. Cell numbers were reduced up to 30% on day two for the cells exposed to the combination of SMF and a 10-MHz RF magnetic field compared with the SMF control cells. In addition, cells exposed to 10-MHz magnetic fields for 8 h increased H_2O_2 production by 55% [40]. The results demonstrate an overall magnetic-field-induced biological effect that shows elevated H_2O_2 levels with accompanying decrease in cellular growth rates. These effects are time dependent, and different cells can respond in opposite directions. Both the forgoing results are believed to occur through the interaction of the RF fields with hyperfine transitions between energy level associate with the generation or absorption of the radicals in the cells.

In addition, exposure at 1 mW and an estimated SAR of 0.76 W/kg for 10 h have been shown to reduce the growth rate of *E. coli* by a more than a factor of two while doing very little to *B. subtilis* [41].

Discussion

We have shown that both a theoretical base and the experimental results exist, demonstrating that weak static, low-frequency, and/or high-frequency magnetic fields can affect the concentration of radicals. There are also results that indicate that weak magnetic fields can change the growth rate of cells. However, there are many experiments where no changes are seen. This, we believe, is due to the many feedback and repair processes in the body. Droge [2] has shown in Figure 7 how extended elevations of ROS and nitrogen oxide species lead undesired biological effects, such as aging, cancer, and Alzheimer's.

The question becomes: What does all this mean for people designing wireless power-transfer systems?

The question becomes: What does all of this mean for people designing wireless power-transfer systems? Typical systems have been designed so that the fringing fields meet current safety standards that have been set on relatively short-term exposures. For example, a system for charging car batteries using capacitive coupling at 6.78 MHz has a calculated maximum electric field of 33 V/m at 0.25 m from the charging plates, and the magnetic flux density is expected to be less than a few microtesla. A 6.6-kW system being developed under contract through Oak Ridge National Labs for charging car batteries using two coils separated 160 mm at 22–26 kHz with 85% efficiency has fringing magnetic fields of less than 6.125 μT and fringing electric fields less than 87 V/m at 0.8 m.

These values are moderately close to the ICNIRP standards of 83 V/m and 27 μT. However, the magnetic flux density is only a little less than 10 μT, which has been shown to change a smooth muscle cell growth rate over a period of days. As people are not likely to stand next to their car for days, long-term effects are not likely to be important. However, there may well be other situations where designers may need to be concerned about the possible effects of long-term exposures.

Conclusions

We think that there are now both the theoretical bases and sufficient experimental results for further consideration of the possibility that long-term exposures to magnetic fields can lead to both useful applications in treating diseases and to undesired health effects. It is expected that these effects are frequency, amplitude, and time dependent. They will also be dependent on other biological conditions that can lead to changes in radical concentrations. In short, we have only begun to scratch the surface, and there is a lot of exciting research to be done before we can understand the ways in which low levels of magnetic fields can be used to control biological systems.

Acknowledgment

We appreciate the support of Khurram Afridi, Robert Erickson, and Dragan Maksimović for obtaining information on current wireless transfer systems and the University of Colorado and the Milheim Foundation for financial support. In addition, the contributions of the many students and, in particular, Lucas Portelli, Carlos Martino, Cynthiea Bingham, Julian Cyrus, Aly Ashraf, and Tosin Feyintola, who have worked on this topic at the University of Colorado are greatly appreciated.

About the Authors

Frank Barnes (Frank.Barnes@colorado.edu) is a distinguished professor emeritus at the University of Colorado, Boulder. He was elected to the National Academy of Engineering in 2001 and received the Gordon Prize 2004 for innovations in Engineering Education from the National Academy. He is a Fellow of the IEEE and the American Association for the Advancement of Science and has served as vice president, Publication Activities of the IEEE and as the chair of the IEEE Electron Devices Society. He and his students have built lasers, flash lamps, superconductors, avalanche photo diodes, and other electron devices as well as working on the effects of electric and magnetic fields on biology. Recently, they have shown that weak magnetic field can both increase and decrease the growth rate of two kinds of cancer and *E.coli*. His other work includes energy storage for renewable energy and the integration of wind and solar energy into the grid.

Ben Greenebaum (greeneba@uwp.edu) is emeritus professor of physics at the University of Wisconsin-Parkside. He has been engaged in research on biological effects of electromagnetic fields on biological systems since 1972, primarily collaborating on experiments on cellular and subcellular systems. He was an editor of the peer-reviewed journal *Bioelectromagnetics* from 1993 to 2006.

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Exhibit No. 7

Understanding EMFs For Engineers & Physicists

Understanding EMFs

Search this site

For Engineers & Physicists

When I first learned about biological effects from wi-fi's low-level radiation, engineers and physicists in my community had a hard time believing there could be a hazard at the non-thermal level. I am very grateful to the following for providing the evidence of harm. These references will help you to understand that the theory which indicates we must create heat to cause harm is now outdated. This means our FCC guidelines, which are based only on thermal effects and do not take into consideration the non-thermal effects, do not protect the public.

- The following document shows that cellular and wireless technologies are on the **electromagnetic radiation spectrum** as non-ionizing microwave radiation:

  http://www.citizensforsafetechnology.co/wp-content/uploads/2016/10/Electromagnetic_Spectrum_Chart.pdf

- In March 2016, the IEEE acknowledged biological effects of non-ionizing microwaves in the ***IEEE Power Electronics Magazine*** article, "Some Effects of Weak Magnetic Fields on Biological Systems: RF fields can change radical concentrations and cancer cell growth rates."

- In May 2016, the **U.S. National Toxicology Program (NTP)** released peer-reviewed partial findings in a $25 million study, commissioned by the U.S. Food and Drug Administration, indicating **cell phone radiation causes DNA damage, and brain and heart tumors**. Additional findings will be reported out in 2017 as analysis is completed and peer reviewed. Joel M Moskowitz, Ph.D., Director, Center for Family and Community Health, University of California, Berkeley provides a sheet for sifting through the facts vs. industry spin on the NTP report:

  https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnx1bmRlcnN0YW5

- **Dr. Martin Pall**, wireless radiation expert, explains that it is not necessarily the power level that is the main issue. The spiked, erratic, digital radiofrequency radiation pulse that carries data is the hazard. Wireless technology sends many bursts of pulsed electromagnetic radiation per second, and this constant, erratic square-wave pulse is what is damaging our cells at the **voltage-gated calcium channels**, and creating a host of illnesses in our bodies. He talks us through it here in a 16-minute lecture:

  https://www.youtube.com/watch?v=3kQQyU8NHv8

- In the link to Dr. Pall's work above, we learn that wi-fi radiation causes a particularly nasty free radical called **peroxynitrite** that leads to a host of health issues. In the following paper, a researcher has pulled together U.S. government database statistics on 40 diseases that have more than doubled in the U.S. since 1990. The common denominator is that all are tied to peroxynitrite. Peroxynitrite is caused by wireless radiation and other environmental toxins. Please see this report, it identifies the skyrocketing rates of autism, Alzheimer's, bi-polar, chronic fatigue, sleep disruption, thyroid disease, social and emotional issues, and more:

  https://www.researchgate.net/publication/303673576_The_Root_(

  By simply using hard-wired technology instead of radiation-emitting wireless, we could dramatically reduce our risks of these diseases. If we don't, the trajectory is that we will continue to become sicker and sicker as a nation, and as a world.

- **Columbia University's Dr. Martin Blank** speaks on behalf of more than 200 non-industry funded electromagnetic field (EMF) scientists and engineers from around the world who are urging the United Nations and World Health Organization to protect the public from wireless radiation. Please see the International EMF Scientists Appeal here, and Dr. Blank's three-minute video introduction:

  https://www.emfscientist.org/

- **Electrical Engineer Professor Om Ghandi, Ph.D.**, has proven that **children and fetuses absorb more radiation** than even adults as their brains are more aqueous and their skulls are

thinner. You can see his work and contact him here with questions:

https://faculty.utah.edu/u0029832-Om_P._Gandhi/bibliography/index.html

- The **BioInitiative Report** contains peer-reviewed, non-industry funded studies from around the world that show biological effects at the non-thermal level. To access searchable summaries of the research done through 2014, see Dr. Henry Lai**'s** work at:

  http://www.bioinitiative.org/research-summaries/

- Silicon Valley engineer **Jeromy Johnson** became ill when a bank of utility "smart meters" was installed beneath his living quarters. This set him on a journey to understand the biological effects of electromagnetic radiation. He discusses the issue and offers solutions in this 16-minute **TedX-BerkeleyTalk**:

  https://www.youtube.com/watch?v=F0NEaPTu9oI

- **Jeromy Johnson** also published the following article in **The Bent**, the National Engineering Honor Society magazine. The organization has a membership of 87,000 engineers across the country. The article succinctly summarizes how EMF science now shows that wireless technology can harm our health and offers solutions for our society:

  https://www.emfanalysis.com/new-paradigm-emf-science/

- Retired Harvard trained **U.S. Government Physicist Dr. Ronald Powell**, from Maryland, has issued open letters for schools and libraries to begin protecting their citizens from wireless radiation:

- http://www.scribd.com/doc/289778053/Message-to-Schools-and-Colleges-about-Wireless-Devices-and-Health

  http://www.scribd.com/doc/300834441/Message-to-Public-Libraries-About-Wireless-Devices-and-Health

- Dr. Powell has also authored several papers to help consumers and public agencies understand the implications of **utility "smart meters"** including illness symptoms, questions to ask

your energy company, FCC limits, a ranking of smart utility meter types and more:

http://www.scribd.com/doc/291507610/Documents-on-Wireless-Technology-and-Health-by-Ronald-M-Powell-Ph-D

- Technology should not be rolled out until it is proven biologically safe but that did not happen with wireless and cellular products. **Harvard University's** Captured Agency **report** explains how the telecommunications industry marketed products without proper safety testing:

  http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf

- When **Microsoft Canada President Frank Clegg** retired, he sought out a dozen of the world's top scientists in electromagnetic fields (EMFs). He came back realizing our electromagnetic radiation public exposure limits in North America are not safe. Please see this briefing which he and **Nobel Peace Prize co-laureate Dr. Devra Davis** gave to the **Massachusetts legislature**. Mr. Clegg believes, given a nudge, the industry can absolutely create technology that is not only safe, but faster and less expensive. Please see their talk here:

  https://vimeo.com/134411701

- This **five-part cable series** explains this complex issue in what some have found to be a very down-to-earth way. When viewed on YouTube, you will be able to access links below each video to the scientific evidence and other important resources. Each episode averages just 30 minutes so you'll be able to digest new information before moving onto the next episode:

  tinyurl.com/Dangers-of-Wi-Fi

- This issue didn't really sink in for me until I could see and hear it for myself. I invested in **a $400 Acoustimeter** and my local cable station helped do a walk-through video in my home. We identified the wireless radiation emission sources, measured them, and offer solutions for safe technology access:

  https://vimeo.com/159873631

- I hope you will really examine the peer-reviewed, non-industry funded evidence that wireless technology is biologically hazardous, and that our world scientists recognize this as the biggest public health threat we have ever faced. Then, I hope you will **use your voice and talents to help be part of** the solution. Feel free to peruse the rest of this research repository for additional information. Don't hesitate to reach out to the many experts included herein, they would be honored to speak with you.

  In the meantime, please **consider hard-wiring what you can, set your mobile devices to airplane mode, and only use active mode sparingly**, when you have no access to a hard-wired connection. Please also **be mindful of the second-hand radiation** to which you expose others, especially our most vulnerable populations of children, fetuses, the elderly, and those with known health conditions.

  Thank you for your time and consideration.

Exhibit No. 8

United Nations Convention on the Rights of Persons with Disabilities and Optional Protocol

Convention on the Rights of Persons with Disabilities and Optional Protocol

UNITED NATIONS

CONVENTION ON THE RIGHTS OF PERSONS WITH DISABILITIES

Preamble

The States Parties to the present Convention,

(*a*) *Recalling* the principles proclaimed in the Charter of the United Nations which recognize the inherent dignity and worth and the equal and inalienable rights of all members of the human family as the foundation of freedom, justice and peace in the world,

(*b*) *Recognizing* that the United Nations, in the Universal Declaration of Human Rights and in the International Covenants on Human Rights, has proclaimed and agreed that everyone is entitled to all the rights and freedoms set forth therein, without distinction of any kind,

(*c*) *Reaffirming* the universality, indivisibility, interdependence and interrelatedness of all human rights and fundamental freedoms and the need for persons with disabilities to be guaranteed their full enjoyment without discrimination,

(*d*) *Recalling* the International Covenant on Economic, Social and Cultural Rights, the International Covenant on Civil and Political Rights, the International Convention on the Elimination of All Forms of Racial Discrimination, the Convention on the Elimination of All Forms of Discrimination against Women, the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, the Convention on the Rights of the Child, and the International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families,

(*e*) *Recognizing* that disability is an evolving concept and that disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others,

(*f*) *Recognizing* the importance of the principles and policy guidelines contained in the World Programme of Action concerning Disabled Persons and in the Standard Rules on the Equalization of Opportunities for Persons with Disabilities in influencing the promotion, formulation and evaluation of the policies, plans, programmes and actions at the national, regional and international levels to further equalize opportunities for persons with disabilities,

(*g*) *Emphasizing* the importance of mainstreaming disability issues as an integral part of relevant strategies of sustainable development,

(*h*) *Recognizing also* that discrimination against any person on the basis of disability is a violation of the inherent dignity and worth of the human person,

(*i*) *Recognizing further* the diversity of persons with disabilities,

(*j*) *Recognizing* the need to promote and protect the human rights of all persons with disabilities, including those who require more intensive support,

(*k*) *Concerned* that, despite these various instruments and undertakings, persons with disabilities continue to face barriers in their participation as equal members of society and violations of their human rights in all parts of the world,

(*l*) *Recognizing* the importance of international cooperation for improving the living conditions of persons with disabilities in every country, particularly in developing countries,

(*m*) *Recognizing* the valued existing and potential contributions made by persons with disabilities to the overall well-being and diversity of their communities, and that the promotion of the full enjoyment by persons with disabilities of their human rights and fundamental freedoms and of full participation by persons with disabilities will result in their enhanced sense of belonging and in significant advances in the human, social and economic development of society and the eradication of poverty,

(*n*) *Recognizing* the importance for persons with disabilities of their individual autonomy and independence, including the freedom to make their own choices,

(*o*) *Considering* that persons with disabilities should have the opportunity to be actively involved in decision-making processes about policies and programmes, including those directly concerning them,

(*p*) *Concerned* about the difficult conditions faced by persons with disabilities who are subject to multiple or aggravated forms of discrimination on the basis of race, colour, sex, language, religion, political or other opinion, national, ethnic, indigenous or social origin, property, birth, age or other status,

(*q*) *Recognizing* that women and girls with disabilities are often at greater risk, both within and outside the home, of violence, injury or abuse, neglect or negligent treatment, maltreatment or exploitation,

(*r*) *Recognizing* that children with disabilities should have full enjoyment of all human rights and fundamental freedoms on an equal basis

with other children, and recalling obligations to that end undertaken by States Parties to the Convention on the Rights of the Child,

(*s*) *Emphasizing* the need to incorporate a gender perspective in all efforts to promote the full enjoyment of human rights and fundamental freedoms by persons with disabilities,

(*t*) *Highlighting* the fact that the majority of persons with disabilities live in conditions of poverty, and in this regard recognizing the critical need to address the negative impact of poverty on persons with disabilities,

(*u*) *Bearing in mind* that conditions of peace and security based on full respect for the purposes and principles contained in the Charter of the United Nations and observance of applicable human rights instruments are indispensable for the full protection of persons with disabilities, in particular during armed conflicts and foreign occupation,

(*v*) *Recognizing* the importance of accessibility to the physical, social, economic and cultural environment, to health and education and to information and communication, in enabling persons with disabilities to fully enjoy all human rights and fundamental freedoms,

(*w*) *Realizing* that the individual, having duties to other individuals and to the community to which he or she belongs, is under a responsibility to strive for the promotion and observance of the rights recognized in the International Bill of Human Rights,

(*x*) *Convinced* that the family is the natural and fundamental group unit of society and is entitled to protection by society and the State, and that persons with disabilities and their family members should receive the necessary protection and assistance to enable families to contribute towards the full and equal enjoyment of the rights of persons with disabilities,

(*y*) *Convinced* that a comprehensive and integral international convention to promote and protect the rights and dignity of persons with disabilities will make a significant contribution to redressing the profound social disadvantage of persons with disabilities and promote their participation in the civil, political, economic, social and cultural spheres with equal opportunities, in both developing and developed countries,

Have agreed as follows:

Article 1
Purpose

The purpose of the present Convention is to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity.

Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.

Article 2
Definitions

For the purposes of the present Convention:

"Communication" includes languages, display of text, Braille, tactile communication, large print, accessible multimedia as well as written, audio, plain-language, human-reader and augmentative and alternative modes, means and formats of communication, including accessible information and communication technology;

"Language" includes spoken and signed languages and other forms of non spoken languages;

"Discrimination on the basis of disability" means any distinction, exclusion or restriction on the basis of disability which has the purpose or effect of impairing or nullifying the recognition, enjoyment or exercise, on an equal basis with others, of all human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field. It includes all forms of discrimination, including denial of reasonable accommodation;

"Reasonable accommodation" means necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms;

"Universal design" means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. "Universal design" shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.

Article 3
General principles

The principles of the present Convention shall be:

(*a*) Respect for inherent dignity, individual autonomy including the freedom to make one's own choices, and independence of persons;

(*b*) Non-discrimination;

(*c*) Full and effective participation and inclusion in society;

(*d*) Respect for difference and acceptance of persons with disabilities as part of human diversity and humanity;

(*e*) Equality of opportunity;

(*f*) Accessibility;

(*g*) Equality between men and women;

(*h*) Respect for the evolving capacities of children with disabilities and respect for the right of children with disabilities to preserve their identities.

Article 4
General obligations

1. States Parties undertake to ensure and promote the full realization of all human rights and fundamental freedoms for all persons with disabilities without discrimination of any kind on the basis of disability. To this end, States Parties undertake:

(*a*) To adopt all appropriate legislative, administrative and other measures for the implementation of the rights recognized in the present Convention;

(*b*) To take all appropriate measures, including legislation, to modify or abolish existing laws, regulations, customs and practices that constitute discrimination against persons with disabilities;

(*c*) To take into account the protection and promotion of the human rights of persons with disabilities in all policies and programmes;

(*d*) To refrain from engaging in any act or practice that is inconsistent with the present Convention and to ensure that public authorities and institutions act in conformity with the present Convention;

(*e*) To take all appropriate measures to eliminate discrimination on the basis of disability by any person, organization or private enterprise;

(*f*) To undertake or promote research and development of universally designed goods, services, equipment and facilities, as defined in article 2 of the present Convention, which should require the minimum possible adaptation and the least cost to meet the specific needs of a person with disabilities, to promote their availability and use, and to promote universal design in the development of standards and guidelines;

(*g*) To undertake or promote research and development of, and to promote the availability and use of new technologies, including information and communications technologies, mobility aids, devices and assistive technologies, suitable for persons with disabilities, giving priority to technologies at an affordable cost;

(*h*) To provide accessible information to persons with disabilities about mobility aids, devices and assistive technologies, including new technologies, as well as other forms of assistance, support services and facilities;

(*i*) To promote the training of professionals and staff working with persons with disabilities in the rights recognized in the present Convention so as to better provide the assistance and services guaranteed by those rights.

2. With regard to economic, social and cultural rights, each State Party undertakes to take measures to the maximum of its available resources and, where needed, within the framework of international cooperation, with a view to achieving progressively the full realization of these rights, without prejudice to those obligations contained in the present Convention that are immediately applicable according to international law.

3. In the development and implementation of legislation and policies to implement the present Convention, and in other decision-making processes concerning issues relating to persons with disabilities, States Parties shall closely consult with and actively involve persons with disabilities, including children with disabilities, through their representative organizations.

4. Nothing in the present Convention shall affect any provisions which are more conducive to the realization of the rights of persons with disabilities and which may be contained in the law of a State Party or international law in force for that State. There shall be no restriction upon or derogation from any of the

human rights and fundamental freedoms recognized or existing in any State Party to the present Convention pursuant to law, conventions, regulation or custom on the pretext that the present Convention does not recognize such rights or freedoms or that it recognizes them to a lesser extent.

5. The provisions of the present Convention shall extend to all parts of federal States without any limitations or exceptions.

Article 5
Equality and non-discrimination

1. States Parties recognize that all persons are equal before and under the law and are entitled without any discrimination to the equal protection and equal benefit of the law.

2. States Parties shall prohibit all discrimination on the basis of disability and guarantee to persons with disabilities equal and effective legal protection against discrimination on all grounds.

3. In order to promote equality and eliminate discrimination, States Parties shall take all appropriate steps to ensure that reasonable accommodation is provided.

4. Specific measures which are necessary to accelerate or achieve de facto equality of persons with disabilities shall not be considered discrimination under the terms of the present Convention.

Article 6
Women with disabilities

1. States Parties recognize that women and girls with disabilities are subject to multiple discrimination, and in this regard shall take measures to ensure the full and equal enjoyment by them of all human rights and fundamental freedoms.

2. States Parties shall take all appropriate measures to ensure the full development, advancement and empowerment of women, for the purpose of guaranteeing them the exercise and enjoyment of the human rights and fundamental freedoms set out in the present Convention.

Article 7
Children with disabilities

1. States Parties shall take all necessary measures to ensure the full enjoyment by children with disabilities of all human rights and fundamental freedoms on an equal basis with other children.

2. In all actions concerning children with disabilities, the best interests of the child shall be a primary consideration.

3. States Parties shall ensure that children with disabilities have the right to express their views freely on all matters affecting them, their views being given due weight in accordance with their age and maturity, on an equal basis with other children, and to be provided with disability and age-appropriate assistance to realize that right.

Article 8
Awareness-raising

1. States Parties undertake to adopt immediate, effective and appropriate measures:

(*a*) To raise awareness throughout society, including at the family level, regarding persons with disabilities, and to foster respect for the rights and dignity of persons with disabilities;

(*b*) To combat stereotypes, prejudices and harmful practices relating to persons with disabilities, including those based on sex and age, in all areas of life;

(*c*) To promote awareness of the capabilities and contributions of persons with disabilities.

2. Measures to this end include:

(*a*) Initiating and maintaining effective public awareness campaigns designed:

(i) To nurture receptiveness to the rights of persons with disabilities;

(ii) To promote positive perceptions and greater social awareness towards persons with disabilities;

(iii) To promote recognition of the skills, merits and abilities of persons with disabilities, and of their contributions to the workplace and the labour market;

(*b*) Fostering at all levels of the education system, including in all children from an early age, an attitude of respect for the rights of persons with disabilities;

(*c*) Encouraging all organs of the media to portray persons with disabilities in a manner consistent with the purpose of the present Convention;

(*d*) Promoting awareness-training programmes regarding persons with disabilities and the rights of persons with disabilities.

Article 9
Accessibility

1. To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas. These measures, which shall include the identification and elimination of obstacles and barriers to accessibility, shall apply to, inter alia:

(*a*) Buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces;

(*b*) Information, communications and other services, including electronic services and emergency services.

2. States Parties shall also take appropriate measures:

(*a*) To develop, promulgate and monitor the implementation of minimum standards and guidelines for the accessibility of facilities and services open or provided to the public;

(*b*) To ensure that private entities that offer facilities and services which are open or provided to the public take into account all aspects of accessibility for persons with disabilities;

(*c*) To provide training for stakeholders on accessibility issues facing persons with disabilities;

(*d*) To provide in buildings and other facilities open to the public signage in Braille and in easy to read and understand forms;

(*e*) To provide forms of live assistance and intermediaries, including guides, readers and professional sign language interpreters, to facilitate accessibility to buildings and other facilities open to the public;

(*f*) To promote other appropriate forms of assistance and support to persons with disabilities to ensure their access to information;

(*g*) To promote access for persons with disabilities to new information and communications technologies and systems, including the Internet;

(*h*) To promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost.

Article 10
Right to life

States Parties reaffirm that every human being has the inherent right to life and shall take all necessary measures to ensure its effective enjoyment by persons with disabilities on an equal basis with others.

Article 11
Situations of risk and humanitarian emergencies

States Parties shall take, in accordance with their obligations under international law, including international humanitarian law and international human rights law, all necessary measures to ensure the protection and safety of persons with disabilities in situations of risk, including situations of armed conflict, humanitarian emergencies and the occurrence of natural disasters.

Article 12
Equal recognition before the law

1. States Parties reaffirm that persons with disabilities have the right to recognition everywhere as persons before the law.

2. States Parties shall recognize that persons with disabilities enjoy legal capacity on an equal basis with others in all aspects of life.

3. States Parties shall take appropriate measures to provide access by persons with disabilities to the support they may require in exercising their legal capacity.

4. States Parties shall ensure that all measures that relate to the exercise of legal capacity provide for appropriate and effective safeguards to prevent abuse in accordance with international human rights law. Such safeguards shall ensure that measures relating to the exercise of legal capacity respect the rights, will and preferences of the person, are free of conflict of interest and undue influence, are proportional and tailored to the person's circumstances, apply for the shortest time possible and are subject to regular review by a competent, independent and impartial authority or judicial body. The

safeguards shall be proportional to the degree to which such measures affect the person's rights and interests.

5. Subject to the provisions of this article, States Parties shall take all appropriate and effective measures to ensure the equal right of persons with disabilities to own or inherit property, to control their own financial affairs and to have equal access to bank loans, mortgages and other forms of financial credit, and shall ensure that persons with disabilities are not arbitrarily deprived of their property.

Article 13
Access to justice

1. States Parties shall ensure effective access to justice for persons with disabilities on an equal basis with others, including through the provision of procedural and age-appropriate accommodations, in order to facilitate their effective role as direct and indirect participants, including as witnesses, in all legal proceedings, including at investigative and other preliminary stages.

2. In order to help to ensure effective access to justice for persons with disabilities, States Parties shall promote appropriate training for those working in the field of administration of justice, including police and prison staff.

Article 14
Liberty and security of person

1. States Parties shall ensure that persons with disabilities, on an equal basis with others:

(*a*) Enjoy the right to liberty and security of person;

(*b*) Are not deprived of their liberty unlawfully or arbitrarily, and that any deprivation of liberty is in conformity with the law, and that the existence of a disability shall in no case justify a deprivation of liberty.

2. States Parties shall ensure that if persons with disabilities are deprived of their liberty through any process, they are, on an equal basis with others, entitled to guarantees in accordance with international human rights law and shall be treated in compliance with the objectives and principles of the present Convention, including by provision of reasonable accommodation.

Article 15
Freedom from torture or cruel, inhuman or degrading treatment or punishment

1. No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. In particular, no one shall be subjected without his or her free consent to medical or scientific experimentation.

2. States Parties shall take all effective legislative, administrative, judicial or other measures to prevent persons with disabilities, on an equal basis with others, from being subjected to torture or cruel, inhuman or degrading treatment or punishment.

Article 16
Freedom from exploitation, violence and abuse

1. States Parties shall take all appropriate legislative, administrative, social, educational and other measures to protect persons with disabilities, both within and outside the home, from all forms of exploitation, violence and abuse, including their gender-based aspects.

2. States Parties shall also take all appropriate measures to prevent all forms of exploitation, violence and abuse by ensuring, inter alia, appropriate forms of gender- and age-sensitive assistance and support for persons with disabilities and their families and caregivers, including through the provision of information and education on how to avoid, recognize and report instances of exploitation, violence and abuse. States Parties shall ensure that protection services are age-, gender- and disability-sensitive.

3. In order to prevent the occurrence of all forms of exploitation, violence and abuse, States Parties shall ensure that all facilities and programmes designed to serve persons with disabilities are effectively monitored by independent authorities.

4. States Parties shall take all appropriate measures to promote the physical, cognitive and psychological recovery, rehabilitation and social reintegration of persons with disabilities who become victims of any form of exploitation, violence or abuse, including through the provision of protection services. Such recovery and reintegration shall take place in an environment that fosters the health, welfare, self-respect, dignity and autonomy of the person and takes into account gender- and age-specific needs.

5. States Parties shall put in place effective legislation and policies, including women- and child-focused legislation and policies, to ensure that instances of exploitation, violence and abuse against persons with disabilities are identified, investigated and, where appropriate, prosecuted.

Article 17
Protecting the integrity of the person

Every person with disabilities has a right to respect for his or her physical and mental integrity on an equal basis with others.

Article 18
Liberty of movement and nationality

1. States Parties shall recognize the rights of persons with disabilities to liberty of movement, to freedom to choose their residence and to a nationality, on an equal basis with others, including by ensuring that persons with disabilities:

(*a*) Have the right to acquire and change a nationality and are not deprived of their nationality arbitrarily or on the basis of disability;

(*b*) Are not deprived, on the basis of disability, of their ability to obtain, possess and utilize documentation of their nationality or other documentation of identification, or to utilize relevant processes such as immigration proceedings, that may be needed to facilitate exercise of the right to liberty of movement;

(*c*) Are free to leave any country, including their own;

(*d*) Are not deprived, arbitrarily or on the basis of disability, of the right to enter their own country.

2. Children with disabilities shall be registered immediately after birth and shall have the right from birth to a name, the right to acquire a nationality and, as far as possible, the right to know and be cared for by their parents.

Article 19
Living independently and being included in the community

States Parties to the present Convention recognize the equal right of all persons with disabilities to live in the community, with choices equal to others, and shall take effective and appropriate measures to facilitate full enjoyment by persons with disabilities of this right and their full inclusion and participation in the community, including by ensuring that:

(*a*) Persons with disabilities have the opportunity to choose their place of residence and where and with whom they live on an equal basis with others and are not obliged to live in a particular living arrangement;

(*b*) Persons with disabilities have access to a range of in-home, residential and other community support services, including personal assistance necessary to support living and inclusion in the community, and to prevent isolation or segregation from the community;

(*c*) Community services and facilities for the general population are available on an equal basis to persons with disabilities and are responsive to their needs.

Article 20
Personal mobility

States Parties shall take effective measures to ensure personal mobility with the greatest possible independence for persons with disabilities, including by:

(*a*) Facilitating the personal mobility of persons with disabilities in the manner and at the time of their choice, and at affordable cost;

(*b*) Facilitating access by persons with disabilities to quality mobility aids, devices, assistive technologies and forms of live assistance and intermediaries, including by making them available at affordable cost;

(*c*) Providing training in mobility skills to persons with disabilities and to specialist staff working with persons with disabilities;

(*d*) Encouraging entities that produce mobility aids, devices and assistive technologies to take into account all aspects of mobility for persons with disabilities.

Article 21
Freedom of expression and opinion, and access to information

States Parties shall take all appropriate measures to ensure that persons with disabilities can exercise the right to freedom of expression and opinion, including the freedom to seek, receive and impart information and ideas on an equal basis with others and through all forms of communication of their choice, as defined in article 2 of the present Convention, including by:

(*a*) Providing information intended for the general public to persons with disabilities in accessible formats and technologies appropriate to different kinds of disabilities in a timely manner and without additional cost;

(*b*) Accepting and facilitating the use of sign languages, Braille, augmentative and alternative communication, and all other accessible means,

modes and formats of communication of their choice by persons with disabilities in official interactions;

(*c*) Urging private entities that provide services to the general public, including through the Internet, to provide information and services in accessible and usable formats for persons with disabilities;

(*d*) Encouraging the mass media, including providers of information through the Internet, to make their services accessible to persons with disabilities;

(*e*) Recognizing and promoting the use of sign languages.

Article 22
Respect for privacy

1. No person with disabilities, regardless of place of residence or living arrangements, shall be subjected to arbitrary or unlawful interference with his or her privacy, family, home or correspondence or other types of communication or to unlawful attacks on his or her honour and reputation. Persons with disabilities have the right to the protection of the law against such interference or attacks.

2. States Parties shall protect the privacy of personal, health and rehabilitation information of persons with disabilities on an equal basis with others.

Article 23
Respect for home and the family

1. States Parties shall take effective and appropriate measures to eliminate discrimination against persons with disabilities in all matters relating to marriage, family, parenthood and relationships, on an equal basis with others, so as to ensure that:

(*a*) The right of all persons with disabilities who are of marriageable age to marry and to found a family on the basis of free and full consent of the intending spouses is recognized;

(*b*) The rights of persons with disabilities to decide freely and responsibly on the number and spacing of their children and to have access to age-appropriate information, reproductive and family planning education are recognized, and the means necessary to enable them to exercise these rights are provided;

(*c*) Persons with disabilities, including children, retain their fertility on an equal basis with others.

2. States Parties shall ensure the rights and responsibilities of persons with disabilities, with regard to guardianship, wardship, trusteeship, adoption of children or similar institutions, where these concepts exist in national legislation; in all cases the best interests of the child shall be paramount. States Parties shall render appropriate assistance to persons with disabilities in the performance of their child-rearing responsibilities.

3. States Parties shall ensure that children with disabilities have equal rights with respect to family life. With a view to realizing these rights, and to prevent concealment, abandonment, neglect and segregation of children with disabilities, States Parties shall undertake to provide early and comprehensive information, services and support to children with disabilities and their families.

4. States Parties shall ensure that a child shall not be separated from his or her parents against their will, except when competent authorities subject to judicial review determine, in accordance with applicable law and procedures, that such separation is necessary for the best interests of the child. In no case shall a child be separated from parents on the basis of a disability of either the child or one or both of the parents.

5. States Parties shall, where the immediate family is unable to care for a child with disabilities, undertake every effort to provide alternative care within the wider family, and failing that, within the community in a family setting.

Article 24
Education

1. States Parties recognize the right of persons with disabilities to education. With a view to realizing this right without discrimination and on the basis of equal opportunity, States Parties shall ensure an inclusive education system at all levels and lifelong learning directed to:

(*a*) The full development of human potential and sense of dignity and self-worth, and the strengthening of respect for human rights, fundamental freedoms and human diversity;

(*b*) The development by persons with disabilities of their personality, talents and creativity, as well as their mental and physical abilities, to their fullest potential;

(*c*) Enabling persons with disabilities to participate effectively in a free society.

2. In realizing this right, States Parties shall ensure that:

(*a*) Persons with disabilities are not excluded from the general education system on the basis of disability, and that children with disabilities are not excluded from free and compulsory primary education, or from secondary education, on the basis of disability;

(*b*) Persons with disabilities can access an inclusive, quality and free primary education and secondary education on an equal basis with others in the communities in which they live;

(*c*) Reasonable accommodation of the individual's requirements is provided;

(*d*) Persons with disabilities receive the support required, within the general education system, to facilitate their effective education;

(*e*) Effective individualized support measures are provided in environments that maximize academic and social development, consistent with the goal of full inclusion.

3. States Parties shall enable persons with disabilities to learn life and social development skills to facilitate their full and equal participation in education and as members of the community. To this end, States Parties shall take appropriate measures, including:

(*a*) Facilitating the learning of Braille, alternative script, augmentative and alternative modes, means and formats of communication and orientation and mobility skills, and facilitating peer support and mentoring;

(*b*) Facilitating the learning of sign language and the promotion of the linguistic identity of the deaf community;

(*c*) Ensuring that the education of persons, and in particular children, who are blind, deaf or deafblind, is delivered in the most appropriate languages and modes and means of communication for the individual, and in environments which maximize academic and social development.

4. In order to help ensure the realization of this right, States Parties shall take appropriate measures to employ teachers, including teachers with disabilities, who are qualified in sign language and/or Braille, and to train professionals and staff who work at all levels of education. Such training shall incorporate disability awareness and the use of appropriate augmentative and alternative modes, means and formats of communication, educational techniques and materials to support persons with disabilities.

5. States Parties shall ensure that persons with disabilities are able to access general tertiary education, vocational training, adult education and lifelong learning without discrimination and on an equal basis with others. To this end, States Parties shall ensure that reasonable accommodation is provided to persons with disabilities.

Article 25
Health

States Parties recognize that persons with disabilities have the right to the enjoyment of the highest attainable standard of health without discrimination on the basis of disability. States Parties shall take all appropriate measures to ensure access for persons with disabilities to health services that are gender-sensitive, including health-related rehabilitation. In particular, States Parties shall:

(*a*) Provide persons with disabilities with the same range, quality and standard of free or affordable health care and programmes as provided to other persons, including in the area of sexual and reproductive health and population-based public health programmes;

(*b*) Provide those health services needed by persons with disabilities specifically because of their disabilities, including early identification and intervention as appropriate, and services designed to minimize and prevent further disabilities, including among children and older persons;

(*c*) Provide these health services as close as possible to people's own communities, including in rural areas;

(*d*) Require health professionals to provide care of the same quality to persons with disabilities as to others, including on the basis of free and informed consent by, inter alia, raising awareness of the human rights, dignity, autonomy and needs of persons with disabilities through training and the promulgation of ethical standards for public and private health care;

(*e*) Prohibit discrimination against persons with disabilities in the provision of health insurance, and life insurance where such insurance is permitted by national law, which shall be provided in a fair and reasonable manner;

(*f*) Prevent discriminatory denial of health care or health services or food and fluids on the basis of disability.

Article 26
Habilitation and rehabilitation

1. States Parties shall take effective and appropriate measures, including through peer support, to enable persons with disabilities to attain and maintain maximum independence, full physical, mental, social and vocational ability, and full inclusion and participation in all aspects of life. To that end, States Parties shall organize, strengthen and extend comprehensive habilitation and rehabilitation services and programmes, particularly in the areas of health, employment, education and social services, in such a way that these services and programmes:

(*a*) Begin at the earliest possible stage, and are based on the multidisciplinary assessment of individual needs and strengths;

(*b*) Support participation and inclusion in the community and all aspects of society, are voluntary, and are available to persons with disabilities as close as possible to their own communities, including in rural areas.

2. States Parties shall promote the development of initial and continuing training for professionals and staff working in habilitation and rehabilitation services.

3. States Parties shall promote the availability, knowledge and use of assistive devices and technologies, designed for persons with disabilities, as they relate to habilitation and rehabilitation.

Article 27
Work and employment

1. States Parties recognize the right of persons with disabilities to work, on an equal basis with others; this includes the right to the opportunity to gain a living by work freely chosen or accepted in a labour market and work environment that is open, inclusive and accessible to persons with disabilities. States Parties shall safeguard and promote the realization of the right to work, including for those who acquire a disability during the course of employment, by taking appropriate steps, including through legislation, to, inter alia:

(*a*) Prohibit discrimination on the basis of disability with regard to all matters concerning all forms of employment, including conditions of recruitment, hiring and employment, continuance of employment, career advancement and safe and healthy working conditions;

(*b*) Protect the rights of persons with disabilities, on an equal basis with others, to just and favourable conditions of work, including equal opportunities and equal remuneration for work of equal value, safe and healthy

working conditions, including protection from harassment, and the redress of grievances;

(*c*) Ensure that persons with disabilities are able to exercise their labour and trade union rights on an equal basis with others;

(*d*) Enable persons with disabilities to have effective access to general technical and vocational guidance programmes, placement services and vocational and continuing training;

(*e*) Promote employment opportunities and career advancement for persons with disabilities in the labour market, as well as assistance in finding, obtaining, maintaining and returning to employment;

(*f*) Promote opportunities for self-employment, entrepreneurship, the development of cooperatives and starting one's own business;

(*g*) Employ persons with disabilities in the public sector;

(*h*) Promote the employment of persons with disabilities in the private sector through appropriate policies and measures, which may include affirmative action programmes, incentives and other measures;

(*i*) Ensure that reasonable accommodation is provided to persons with disabilities in the workplace;

(*j*) Promote the acquisition by persons with disabilities of work experience in the open labour market;

(*k*) Promote vocational and professional rehabilitation, job retention and return-to-work programmes for persons with disabilities.

2. States Parties shall ensure that persons with disabilities are not held in slavery or in servitude, and are protected, on an equal basis with others, from forced or compulsory labour.

Article 28
Adequate standard of living and social protection

1. States Parties recognize the right of persons with disabilities to an adequate standard of living for themselves and their families, including adequate food, clothing and housing, and to the continuous improvement of living conditions, and shall take appropriate steps to safeguard and promote the realization of this right without discrimination on the basis of disability.

2. States Parties recognize the right of persons with disabilities to social protection and to the enjoyment of that right without discrimination on the basis of disability, and shall take appropriate steps to safeguard and promote the realization of this right, including measures:

(*a*) To ensure equal access by persons with disabilities to clean water services, and to ensure access to appropriate and affordable services, devices and other assistance for disability-related needs;

(*b*) To ensure access by persons with disabilities, in particular women and girls with disabilities and older persons with disabilities, to social protection programmes and poverty reduction programmes;

(*c*) To ensure access by persons with disabilities and their families living in situations of poverty to assistance from the State with disability-related expenses, including adequate training, counselling, financial assistance and respite care;

(*d*) To ensure access by persons with disabilities to public housing programmes;

(*e*) To ensure equal access by persons with disabilities to retirement benefits and programmes.

Article 29
Participation in political and public life

States Parties shall guarantee to persons with disabilities political rights and the opportunity to enjoy them on an equal basis with others, and shall undertake:

(*a*) To ensure that persons with disabilities can effectively and fully participate in political and public life on an equal basis with others, directly or through freely chosen representatives, including the right and opportunity for persons with disabilities to vote and be elected, inter alia, by:

(i) Ensuring that voting procedures, facilities and materials are appropriate, accessible and easy to understand and use;

(ii) Protecting the right of persons with disabilities to vote by secret ballot in elections and public referendums without intimidation, and to stand for elections, to effectively hold office and perform all public functions at all levels of government, facilitating the use of assistive and new technologies where appropriate;

(iii) Guaranteeing the free expression of the will of persons with disabilities as electors and to this end, where necessary, at their request, allowing assistance in voting by a person of their own choice;

(*b*) To promote actively an environment in which persons with disabilities can effectively and fully participate in the conduct of public affairs, without discrimination and on an equal basis with others, and encourage their participation in public affairs, including:

(i) Participation in non-governmental organizations and associations concerned with the public and political life of the country, and in the activities and administration of political parties;

(ii) Forming and joining organizations of persons with disabilities to represent persons with disabilities at international, national, regional and local levels.

Article 30
Participation in cultural life, recreation, leisure and sport

1. States Parties recognize the right of persons with disabilities to take part on an equal basis with others in cultural life, and shall take all appropriate measures to ensure that persons with disabilities:

(*a*) Enjoy access to cultural materials in accessible formats;

(*b*) Enjoy access to television programmes, films, theatre and other cultural activities, in accessible formats;

(*c*) Enjoy access to places for cultural performances or services, such as theatres, museums, cinemas, libraries and tourism services, and, as far as possible, enjoy access to monuments and sites of national cultural importance.

2. States Parties shall take appropriate measures to enable persons with disabilities to have the opportunity to develop and utilize their creative, artistic and intellectual potential, not only for their own benefit, but also for the enrichment of society.

3. States Parties shall take all appropriate steps, in accordance with international law, to ensure that laws protecting intellectual property rights do not constitute an unreasonable or discriminatory barrier to access by persons with disabilities to cultural materials.

4. Persons with disabilities shall be entitled, on an equal basis with others, to recognition and support of their specific cultural and linguistic identity, including sign languages and deaf culture.

5. With a view to enabling persons with disabilities to participate on an equal basis with others in recreational, leisure and sporting activities, States Parties shall take appropriate measures:

(*a*) To encourage and promote the participation, to the fullest extent possible, of persons with disabilities in mainstream sporting activities at all levels;

(*b*) To ensure that persons with disabilities have an opportunity to organize, develop and participate in disability-specific sporting and recreational activities and, to this end, encourage the provision, on an equal basis with others, of appropriate instruction, training and resources;

(*c*) To ensure that persons with disabilities have access to sporting, recreational and tourism venues;

(*d*) To ensure that children with disabilities have equal access with other children to participation in play, recreation and leisure and sporting activities, including those activities in the school system;

(*e*) To ensure that persons with disabilities have access to services from those involved in the organization of recreational, tourism, leisure and sporting activities.

Article 31
Statistics and data collection

1. States Parties undertake to collect appropriate information, including statistical and research data, to enable them to formulate and implement policies to give effect to the present Convention. The process of collecting and maintaining this information shall:

(*a*) Comply with legally established safeguards, including legislation on data protection, to ensure confidentiality and respect for the privacy of persons with disabilities;

(*b*) Comply with internationally accepted norms to protect human rights and fundamental freedoms and ethical principles in the collection and use of statistics.

2. The information collected in accordance with this article shall be disaggregated, as appropriate, and used to help assess the implementation of

States Parties' obligations under the present Convention and to identify and address the barriers faced by persons with disabilities in exercising their rights.

3. States Parties shall assume responsibility for the dissemination of these statistics and ensure their accessibility to persons with disabilities and others.

Article 32
International cooperation

1. States Parties recognize the importance of international cooperation and its promotion, in support of national efforts for the realization of the purpose and objectives of the present Convention, and will undertake appropriate and effective measures in this regard, between and among States and, as appropriate, in partnership with relevant international and regional organizations and civil society, in particular organizations of persons with disabilities. Such measures could include, inter alia:

(*a*) Ensuring that international cooperation, including international development programmes, is inclusive of and accessible to persons with disabilities;

(*b*) Facilitating and supporting capacity-building, including through the exchange and sharing of information, experiences, training programmes and best practices;

(*c*) Facilitating cooperation in research and access to scientific and technical knowledge;

(*d*) Providing, as appropriate, technical and economic assistance, including by facilitating access to and sharing of accessible and assistive technologies, and through the transfer of technologies.

2. The provisions of this article are without prejudice to the obligations of each State Party to fulfil its obligations under the present Convention.

Article 33
National implementation and monitoring

1. States Parties, in accordance with their system of organization, shall designate one or more focal points within government for matters relating to the implementation of the present Convention, and shall give due consideration to the establishment or designation of a coordination mechanism within government to facilitate related action in different sectors and at different levels.

2. States Parties shall, in accordance with their legal and administrative systems, maintain, strengthen, designate or establish within the State Party, a framework, including one or more independent mechanisms, as appropriate, to promote, protect and monitor implementation of the present Convention. When designating or establishing such a mechanism, States Parties shall take into account the principles relating to the status and functioning of national institutions for protection and promotion of human rights.

3. Civil society, in particular persons with disabilities and their representative organizations, shall be involved and participate fully in the monitoring process.

Article 34
Committee on the Rights of Persons with Disabilities

1. There shall be established a Committee on the Rights of Persons with Disabilities (hereafter referred to as "the Committee"), which shall carry out the functions hereinafter provided.

2. The Committee shall consist, at the time of entry into force of the present Convention, of twelve experts. After an additional sixty ratifications or accessions to the Convention, the membership of the Committee shall increase by six members, attaining a maximum number of eighteen members.

3. The members of the Committee shall serve in their personal capacity and shall be of high moral standing and recognized competence and experience in the field covered by the present Convention. When nominating their candidates, States Parties are invited to give due consideration to the provision set out in article 4, paragraph 3, of the present Convention.

4. The members of the Committee shall be elected by States Parties, consideration being given to equitable geographical distribution, representation of the different forms of civilization and of the principal legal systems, balanced gender representation and participation of experts with disabilities.

5. The members of the Committee shall be elected by secret ballot from a list of persons nominated by the States Parties from among their nationals at meetings of the Conference of States Parties. At those meetings, for which two thirds of States Parties shall constitute a quorum, the persons elected to the Committee shall be those who obtain the largest number of votes and an absolute majority of the votes of the representatives of States Parties present and voting.

6. The initial election shall be held no later than six months after the date of entry into force of the present Convention. At least four months before the date of each election, the Secretary-General of the United Nations shall

address a letter to the States Parties inviting them to submit the nominations within two months. The Secretary-General shall subsequently prepare a list in alphabetical order of all persons thus nominated, indicating the State Parties which have nominated them, and shall submit it to the States Parties to the present Convention.

7. The members of the Committee shall be elected for a term of four years. They shall be eligible for re-election once. However, the term of six of the members elected at the first election shall expire at the end of two years; immediately after the first election, the names of these six members shall be chosen by lot by the chairperson of the meeting referred to in paragraph 5 of this article.

8. The election of the six additional members of the Committee shall be held on the occasion of regular elections, in accordance with the relevant provisions of this article.

9. If a member of the Committee dies or resigns or declares that for any other cause she or he can no longer perform her or his duties, the State Party which nominated the member shall appoint another expert possessing the qualifications and meeting the requirements set out in the relevant provisions of this article, to serve for the remainder of the term.

10. The Committee shall establish its own rules of procedure.

11. The Secretary-General of the United Nations shall provide the necessary staff and facilities for the effective performance of the functions of the Committee under the present Convention, and shall convene its initial meeting.

12. With the approval of the General Assembly of the United Nations, the members of the Committee established under the present Convention shall receive emoluments from United Nations resources on such terms and conditions as the Assembly may decide, having regard to the importance of the Committee's responsibilities.

13. The members of the Committee shall be entitled to the facilities, privileges and immunities of experts on mission for the United Nations as laid down in the relevant sections of the Convention on the Privileges and Immunities of the United Nations.

Article 35
Reports by States Parties

1. Each State Party shall submit to the Committee, through the Secretary-General of the United Nations, a comprehensive report on measures taken to give effect to its obligations under the present Convention and on the progress

made in that regard, within two years after the entry into force of the present Convention for the State Party concerned.

2. Thereafter, States Parties shall submit subsequent reports at least every four years and further whenever the Committee so requests.

3. The Committee shall decide any guidelines applicable to the content of the reports.

4. A State Party which has submitted a comprehensive initial report to the Committee need not, in its subsequent reports, repeat information previously provided. When preparing reports to the Committee, States Parties are invited to consider doing so in an open and transparent process and to give due consideration to the provision set out in article 4, paragraph 3, of the present Convention.

5. Reports may indicate factors and difficulties affecting the degree of fulfilment of obligations under the present Convention.

Article 36
Consideration of reports

1. Each report shall be considered by the Committee, which shall make such suggestions and general recommendations on the report as it may consider appropriate and shall forward these to the State Party concerned. The State Party may respond with any information it chooses to the Committee. The Committee may request further information from States Parties relevant to the implementation of the present Convention.

2. If a State Party is significantly overdue in the submission of a report, the Committee may notify the State Party concerned of the need to examine the implementation of the present Convention in that State Party, on the basis of reliable information available to the Committee, if the relevant report is not submitted within three months following the notification. The Committee shall invite the State Party concerned to participate in such examination. Should the State Party respond by submitting the relevant report, the provisions of paragraph 1 of this article will apply.

3. The Secretary-General of the United Nations shall make available the reports to all States Parties.

4. States Parties shall make their reports widely available to the public in their own countries and facilitate access to the suggestions and general recommendations relating to these reports.

5. The Committee shall transmit, as it may consider appropriate, to the specialized agencies, funds and programmes of the United Nations, and other competent bodies, reports from States Parties in order to address a request or indication of a need for technical advice or assistance contained therein, along with the Committee's observations and recommendations, if any, on these requests or indications.

Article 37
Cooperation between States Parties and the Committee

1. Each State Party shall cooperate with the Committee and assist its members in the fulfilment of their mandate.

2. In its relationship with States Parties, the Committee shall give due consideration to ways and means of enhancing national capacities for the implementation of the present Convention, including through international cooperation.

Article 38
Relationship of the Committee with other bodies

In order to foster the effective implementation of the present Convention and to encourage international cooperation in the field covered by the present Convention:

(*a*) The specialized agencies and other United Nations organs shall be entitled to be represented at the consideration of the implementation of such provisions of the present Convention as fall within the scope of their mandate. The Committee may invite the specialized agencies and other competent bodies as it may consider appropriate to provide expert advice on the implementation of the Convention in areas falling within the scope of their respective mandates. The Committee may invite specialized agencies and other United Nations organs to submit reports on the implementation of the Convention in areas falling within the scope of their activities;

(*b*) The Committee, as it discharges its mandate, shall consult, as appropriate, other relevant bodies instituted by international human rights treaties, with a view to ensuring the consistency of their respective reporting guidelines, suggestions and general recommendations, and avoiding duplication and overlap in the performance of their functions.

Article 39
Report of the Committee

The Committee shall report every two years to the General Assembly and to the Economic and Social Council on its activities, and may make

suggestions and general recommendations based on the examination of reports and information received from the States Parties. Such suggestions and general recommendations shall be included in the report of the Committee together with comments, if any, from States Parties.

Article 40
Conference of States Parties

1. The States Parties shall meet regularly in a Conference of States Parties in order to consider any matter with regard to the implementation of the present Convention.

2. No later than six months after the entry into force of the present Convention, the Conference of States Parties shall be convened by the Secretary-General of the United Nations. The subsequent meetings shall be convened by the Secretary-General biennially or upon the decision of the Conference of States Parties.

Article 41
Depositary

The Secretary-General of the United Nations shall be the depositary of the present Convention.

Article 42
Signature

The present Convention shall be open for signature by all States and by regional integration organizations at United Nations Headquarters in New York as of 30 March 2007.

Article 43
Consent to be bound

The present Convention shall be subject to ratification by signatory States and to formal confirmation by signatory regional integration organizations. It shall be open for accession by any State or regional integration organization which has not signed the Convention.

Article 44
Regional integration organizations

1. "Regional integration organization" shall mean an organization constituted by sovereign States of a given region, to which its member States have transferred competence in respect of matters governed by the present Convention. Such organizations shall declare, in their instruments of formal

confirmation or accession, the extent of their competence with respect to matters governed by the present Convention. Subsequently, they shall inform the depositary of any substantial modification in the extent of their competence.

2. References to "States Parties" in the present Convention shall apply to such organizations within the limits of their competence.

3. For the purposes of article 45, paragraph 1, and article 47, paragraphs 2 and 3, of the present Convention, any instrument deposited by a regional integration organization shall not be counted.

4. Regional integration organizations, in matters within their competence, may exercise their right to vote in the Conference of States Parties, with a number of votes equal to the number of their member States that are Parties to the present Convention. Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa.

Article 45
Entry into force

1. The present Convention shall enter into force on the thirtieth day after the deposit of the twentieth instrument of ratification or accession.

2. For each State or regional integration organization ratifying, formally confirming or acceding to the present Convention after the deposit of the twentieth such instrument, the Convention shall enter into force on the thirtieth day after the deposit of its own such instrument.

Article 46
Reservations

1. Reservations incompatible with the object and purpose of the present Convention shall not be permitted.

2. Reservations may be withdrawn at any time.

Article 47
Amendments

1. Any State Party may propose an amendment to the present Convention and submit it to the Secretary-General of the United Nations. The Secretary-General shall communicate any proposed amendments to States Parties, with a request to be notified whether they favour a conference of States Parties for the purpose of considering and deciding upon the proposals. In the event that, within four months from the date of such communication, at least one third of

the States Parties favour such a conference, the Secretary-General shall convene the conference under the auspices of the United Nations. Any amendment adopted by a majority of two thirds of the States Parties present and voting shall be submitted by the Secretary-General to the General Assembly of the United Nations for approval and thereafter to all States Parties for acceptance.

2. An amendment adopted and approved in accordance with paragraph 1 of this article shall enter into force on the thirtieth day after the number of instruments of acceptance deposited reaches two thirds of the number of States Parties at the date of adoption of the amendment. Thereafter, the amendment shall enter into force for any State Party on the thirtieth day following the deposit of its own instrument of acceptance. An amendment shall be binding only on those States Parties which have accepted it.

3. If so decided by the Conference of States Parties by consensus, an amendment adopted and approved in accordance with paragraph 1 of this article which relates exclusively to articles 34, 38, 39 and 40 shall enter into force for all States Parties on the thirtieth day after the number of instruments of acceptance deposited reaches two thirds of the number of States Parties at the date of adoption of the amendment.

Article 48
Denunciation

A State Party may denounce the present Convention by written notification to the Secretary-General of the United Nations. The denunciation shall become effective one year after the date of receipt of the notification by the Secretary-General.

Article 49
Accessible format

The text of the present Convention shall be made available in accessible formats.

Article 50
Authentic texts

The Arabic, Chinese, English, French, Russian and Spanish texts of the present Convention shall be equally authentic.

IN WITNESS THEREOF the undersigned plenipotentiaries, being duly authorized thereto by their respective Governments, have signed the present Convention.

OPTIONAL PROTOCOL TO THE CONVENTION ON THE RIGHTS OF PERSONS WITH DISABILITIES

The States Parties to the present Protocol have agreed as follows:

Article 1

1. A State Party to the present Protocol ("State Party") recognizes the competence of the Committee on the Rights of Persons with Disabilities ("the Committee") to receive and consider communications from or on behalf of individuals or groups of individuals subject to its jurisdiction who claim to be victims of a violation by that State Party of the provisions of the Convention.

2. No communication shall be received by the Committee if it concerns a State Party to the Convention that is not a party to the present Protocol.

Article 2

The Committee shall consider a communication inadmissible when:

(a) The communication is anonymous;
(b) The communication constitutes an abuse of the right of submission of such communications or is incompatible with the provisions of the Convention;
(c) The same matter has already been examined by the Committee or has been or is being examined under another procedure of international investigation or settlement;
(d) All available domestic remedies have not been exhausted. This shall not be the rule where the application of the remedies is unreasonably prolonged or unlikely to bring effective relief;
(e) It is manifestly ill-founded or not sufficiently substantiated; or when
(f) The facts that are the subject of the communication occurred prior to the entry into force of the present Protocol for the State Party concerned unless those facts continued after that date.

Article 3

Subject to the provisions of article 2 of the present Protocol, the Committee shall bring any communications submitted to it confidentially to the attention of the State Party. Within six months, the receiving State shall submit to the Committee written explanations or statements clarifying the matter and the remedy, if any, that may have been taken by that State.

Article 4

1. At any time after the receipt of a communication and before a determination on the merits has been reached, the Committee may transmit to the State Party concerned for its urgent consideration a request that the State Party take such interim measures as may be necessary to avoid possible irreparable damage to the victim or victims of the alleged violation.

2. Where the Committee exercises its discretion under paragraph 1 of this article, this does not imply a determination on admissibility or on the merits of the communication.

Article 5

The Committee shall hold closed meetings when examining communications under the present Protocol. After examining a communication, the Committee shall forward its suggestions and recommendations, if any, to the State Party concerned and to the petitioner.

Article 6

1. If the Committee receives reliable information indicating grave or systematic violations by a State Party of rights set forth in the Convention, the Committee shall invite that State Party to cooperate in the examination of the information and to this end submit observations with regard to the information concerned.

2. Taking into account any observations that may have been submitted by the State Party concerned as well as any other reliable information available to it, the Committee may designate one or more of its members to conduct an inquiry and to report urgently to the Committee. Where warranted and with the consent of the State Party, the inquiry may include a visit to its territory.

3. After examining the findings of such an inquiry, the Committee shall transmit these findings to the State Party concerned together with any comments and recommendations.

4. The State Party concerned shall, within six months of receiving the findings, comments and recommendations transmitted by the Committee, submit its observations to the Committee.

5. Such an inquiry shall be conducted confidentially and the cooperation of the State Party shall be sought at all stages of the proceedings.

Article 7

1. The Committee may invite the State Party concerned to include in its report under article 35 of the Convention details of any measures taken in response to an inquiry conducted under article 6 of the present Protocol.

2. The Committee may, if necessary, after the end of the period of six months referred to in article 6, paragraph 4, invite the State Party concerned to inform it of the measures taken in response to such an inquiry.

Article 8

Each State Party may, at the time of signature or ratification of the present Protocol or accession thereto, declare that it does not recognize the competence of the Committee provided for in articles 6 and 7.

Article 9

The Secretary-General of the United Nations shall be the depositary of the present Protocol.

Article 10

The present Protocol shall be open for signature by signatory States and regional integration organizations of the Convention at United Nations Headquarters in New York as of 30 March 2007.

Article 11

The present Protocol shall be subject to ratification by signatory States of the present Protocol which have ratified or acceded to the Convention. It shall be subject to formal confirmation by signatory regional integration organizations of the present Protocol which have formally confirmed or acceded to the Convention. It shall be open for accession by any State or regional integration organization which has ratified, formally confirmed or acceded to the Convention and which has not signed the Protocol.

Article 12

1. "Regional integration organization" shall mean an organization constituted by sovereign States of a given region, to which its member States have transferred competence in respect of matters governed by the Convention and the present Protocol. Such organizations shall declare, in their instruments of formal confirmation or accession, the extent of their competence with respect to matters governed by the Convention and the present Protocol.

Subsequently, they shall inform the depositary of any substantial modification in the extent of their competence.

2. References to "States Parties" in the present Protocol shall apply to such organizations within the limits of their competence.

3. For the purposes of article 13, paragraph 1, and article 15, paragraph 2, of the present Protocol, any instrument deposited by a regional integration organization shall not be counted.

4. Regional integration organizations, in matters within their competence, may exercise their right to vote in the meeting of States Parties, with a number of votes equal to the number of their member States that are Parties to the present Protocol. Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa.

Article 13

1. Subject to the entry into force of the Convention, the present Protocol shall enter into force on the thirtieth day after the deposit of the tenth instrument of ratification or accession.

2. For each State or regional integration organization ratifying, formally confirming or acceding to the present Protocol after the deposit of the tenth such instrument, the Protocol shall enter into force on the thirtieth day after the deposit of its own such instrument.

Article 14

1. Reservations incompatible with the object and purpose of the present Protocol shall not be permitted.

2. Reservations may be withdrawn at any time.

Article 15

1. Any State Party may propose an amendment to the present Protocol and submit it to the Secretary-General of the United Nations. The Secretary-General shall communicate any proposed amendments to States Parties, with a request to be notified whether they favour a meeting of States Parties for the purpose of considering and deciding upon the proposals. In the event that, within four months from the date of such communication, at least one third of the States Parties favour such a meeting, the Secretary-General shall convene the meeting under the auspices of the United Nations. Any amendment adopted by a majority of two thirds of the States Parties present and voting shall be

submitted by the Secretary-General to the General Assembly of the United Nations for approval and thereafter to all States Parties for acceptance.

2. An amendment adopted and approved in accordance with paragraph 1 of this article shall enter into force on the thirtieth day after the number of instruments of acceptance deposited reaches two thirds of the number of States Parties at the date of adoption of the amendment. Thereafter, the amendment shall enter into force for any State Party on the thirtieth day following the deposit of its own instrument of acceptance. An amendment shall be binding only on those States Parties which have accepted it.

Article 16

A State Party may denounce the present Protocol by written notification to the Secretary-General of the United Nations. The denunciation shall become effective one year after the date of receipt of the notification by the Secretary-General.

Article 17

The text of the present Protocol shall be made available in accessible formats.

Article 18

The Arabic, Chinese, English, French, Russian and Spanish texts of the present Protocol shall be equally authentic.

IN WITNESS THEREOF the undersigned plenipotentiaries, being duly authorized thereto by their respective Governments, have signed the present Protocol.

Exhibit No. 9

Smart Meter Lawsuits

SMART METER LAWSUITS

Naperville, Illinois
Case: 1:15-cv-00720 January 23, 2015 [settled]
MALIA "KIM" BENDIS vs. The CITY OF NAPERVILLE, Illinois, a municipal corporation, and Naperville Police Sergeant NICK LIBERIO (#3714), Detective TAMMY SPENCER-HALE (#7218), Detective WOJTEK KOWAL (#7920), and Officer JUAN RIOS (#4002)
Plaintiff sued regarding the violation of her rights under the United States Constitution and under common law of Illinois to protest something **she was an active protester about — the smart meters**
City Council settled lawsuit and agreed to pay $117,500.00 to Malia "Kim" Bendis for violating her constitutional rights.

Rockingham County, Virginia
Case: CL1400701-00 October 10, 2016 [pending]
Donna Kinney v. Virginia Electric and Power Company
Circuit Court for the County of Rockingham
Seeking $3.5 Million for health damages

Orlando, Florida
Case: 6:14-cv-1975-Orl-40KRS December 2014 [pending]
William R. Metallo v. Orlando Utilities Commission, Don Kirby, John Hugh Dyer, and Wayne R. Zimmerman
U.S. District Court Middle District of Florida Orlando Division
Plaintiff invokes the Americans with Disabilities Act

San Francisco, California
Case No. 4:12-cv-06466 [terminated 7/15/14]
Deborah Cooney v. San Diego Gas & Electric Co., Itron, California Attorney General, California Public Utilities Commission and Michael Peevey, President

In December 2012 **Deborah filed a $120 million federal lawsuit** against San Diego Gas & Electric Co., smart meter manufacturer Itron, the state Attorney General, the state Public Utilities Commission and its president, Michael Peevey, and others.

California
Case No. FCS039967 June 12, 2012 [settled out of court per Atty. David Kyle phone conversation Jan. 11, 2017]
Walter C. Nikkel vs. Pacific Gas & Electric, Wellington Energy, Landis+Gyr
Wrongful death, personal injury, property damage
Filed in the Solano Superior Court
"Involuntarily placing an electrical device commonly known as a "smart meter" on the residence located at 230 Arbor Street, Vacaville, California on or about July 8, 2010 in such a negligent manner, and without regard for the safety of its occupants; which resulted in a fire that cause the death of Larry Nikkel."
http://stopsmartmeters.org/wp-content/uploads/2013/06/Nikkel-complaint.pdf

Exhibit No. 10

Supreme Judicial Court of Maine

Ed Friedman et al v. Public Utilities Commission, et al

49 A.3d 794 (2012)

48 A.3d 794 (2012)
2012 ME 90

Ed FRIEDMAN et al.

v.

PUBLIC UTILITIES COMMISSION, et al.

Docket: PUC-11-532.

Supreme Judicial Court of Maine.

Argued: May 10, 2012.
Decided July 12, 2012.

795 *795 Bruce A. McGlauflin, Esq. (orally), Petruccelli, Martin & Haddow, LLP, Portland, for appellants Ed Friedman, Kathleen McGee, Chester Gillis, Eleanor Gillis, Charlotte T. Iserbyt, Julian Holmes, Nancy Gray, Dan Burk, Deborah Burk, Andrew Fiori, Melissa Fiori, Joe Ciarroco, and Jeanne Johnson.

Jordan D. McColman, Esq. (orally), Leslie E. Raber, Esq., and Mitchell M. Tannenbaum, Esq., Maine Public Utilities Commission, for appellee Public Utilities Commission.

Catherine R. Connors, Esq. (orally), Pierce Atwood LLP, Portland, and Kenneth Farber, Esq., Central Maine Power Company, for appellee Central Maine Power Company.

Panel: SAUFLEY, C.J., and LEVY, SILVER, MEAD, GORMAN, and JABAR, JJ.

LEVY, J.

[¶ 1] Ed Friedman and others (collectively, Friedman) appeal from the Maine Public Utilities Commission's dismissal of their complaint against Central Maine Power Company (CMP) regarding CMP's use of smart-meter technology. Friedman also appeals the Commission's dismissal of those portions of the complaint that were directed at the Commission and raised constitutional concerns regarding orders previously issued by the Commission. Friedman asserts, among other issues, that the Commission erred because its dismissal of his complaint ignored the Commission's statutory mandate to ensure the delivery of safe and reasonable utility services. *See* 35-A M.R.S. §§ 101, 103 (2011). The Commission and CMP contend that the complaint was properly dismissed
796 in all *796 respects. Because we agree with Friedman that the Commission should not have dismissed the portion of the complaint against CMP addressing health and safety issues, we vacate that portion of the judgment and otherwise affirm.

I. BACKGROUND

[¶ 2] The facts giving rise to this complaint begin with the Commission's approval of CMP's advanced metering infrastructure (AMI) project and associated ratemaking in February 2010.[1] *See Order Approving Installation of AMI Technology*, No. 2007-215(II), Order (Me.P.U.C. Feb. 25, 2010). In the year following, the Commission received a number of complaints[2] from customers against CMP regarding the AMI project. *See Notice of Investigation*, Nos. 2010-345, 2010-389, Notice (Me.P.U.C. Jan. 7, 2011) [hereinafter Jan. 7 Notice of Investigation]; *Notice of Investigation*, Nos. 2010-345, 2010-389, 2010-398, 2010-400, Notice (Me.P.U.C. Feb. 18, 2011) [hereinafter Feb. 18 Notice of Investigation]. These complaints raised concerns about the health and safety of smart-meter technology associated with the AMI project — particularly the health effects of radio frequency (RF) radiation emitted by the wireless smart meters — and regarding the technology's potential to violate individuals' privacy and property rights. *See* Jan. 7 Notice of Investigation, at 2, 4; Feb. 18 Notice of Investigation, at 2-3. The complainants expressed concerns that CMP did not allow customers the opportunity to opt out of the AMI project. *See* Jan. 7 Notice of Investigation, at 2, 4; Feb. 18 Notice of Investigation, at 2-3.

797 [¶ 3] In response, the Commission consolidated the complaints and initiated an investigation to "determine whether CMP's act or practice of not allowing individual customers to choose not to have a smart meter installed or to otherwise opt-out of the program is unreasonable, insufficient or unjustly discriminatory." Jan. 7 Notice of Investigation, at 1. After conducting the investigation, the Commission issued an order in two parts, known as the Opt-Out Orders. *See Order (Part I)*, Nos. 2010-345, 2010-389, 2010-398, 2010-400, 2011-085, Order (Me.P.U.C. May 19, 2011) [hereinafter Opt-Out Order Part I]; *Order (Part II)*, Nos. 2010-345, 2010-389, 2010-398, 2010-400, 2011-085, Order (Me. P.U.C. June 22, 2011) [hereinafter Opt-Out Order Part II]. Part I of the Opt-Out Orders, entered in May 2011, ordered CMP to provide two alternatives for customers who choose not to have the standard wireless smart

meter installed on their premises and provided for charges for those customers who elect to participate in the opt-out program.[3] Opt-Out *797 Order Part I, at 2-3. Part II of the Opt-Out Orders, entered in June 2011, addressed the background, analysis, and reasoning underlying the Commission's decision. *See* Opt-Out Order Part II.

[¶ 4] In July 2011, Ed Friedman and eighteen other CMP customers filed a complaint with the Commission against both the Commission and CMP pursuant to 35-A M.R.S. § 1302 (2011). Friedman's complaint explained:

> [T]he complaint is directed not only at CMP for levying what, given the facts, must be an unreasonable, unjust and discriminatory fee against ratepayers choosing to opt out of the smart meter program, but also at the PUC because of its May 19 and June 22, 2011 Orders (Part I and Part II) requiring CMP customers to pay the utility, should they, the ratepayer, elect to opt out of the program.

Friedman's complaint requested that the Commission "open an investigation" to consider "new and important evidence specifically addressing non-ionizing radiation of the type emitted by smart meters," which the complaint noted had been published since the Commission issued Opt-Out Order Part I. The complaint also cited Fourth Amendment concerns regarding privacy and "electronic trespass" and included citations to various articles and studies addressing those issues. In particular, Friedman's complaint cited a press release from the World Health Organization, dated May 31, 2011, that classified RF radiation as "possibly carcinogenic to humans." In addition to other relief, the complaint requested that the Commission order the stay of further installation of smart meters.

[¶ 5] The Commission dismissed Friedman's complaint, without a hearing, by an order entered in August 2011. *See Order Dismissing Complaint*, No. 2011-262, Order (Me.P.U.C. Aug. 31, 2011) [hereinafter Aug. 31 Order]. In its decision, the Commission concluded, "All of the issues raised by the complainants in this matter were raised by one or more of the complainants in the Opt-Out Investigation and were considered by the Commission and resolved during that investigation or in subsequent orders on motions for reconsideration." *Id.* at 5. The Commission also concluded that section 1302 does not authorize a complaint against the Commission itself. *Id.* Friedman filed a motion for reconsideration that was denied by operation of law on the expiration of the twenty-day period for processing such motions. *See* 9 C.M.R. 65-407 110-33 § 1004 (1996). Friedman appeals the dismissal of his complaint.

II. LEGAL ANALYSIS

[¶ 6] We begin by first addressing the Commission's dismissal of those portions of Friedman's complaint directed at CMP and raising (A) health and safety and (B) privacy, trespass, and Fourth Amendment concerns. We then turn to (C) the portions of Friedman's complaint raising constitutional claims directed at the Commission itself. The Commission's dismissal of a complaint is reviewed for an abuse of discretion. *See* Dunn v. Pub. Utils. Comm'n, 2006 ME 4, ¶ 5, 890 A.2d 269 ("Only when the Commission abuses the discretion entrusted to it, or fails to follow the mandate of the legislature, or to be bound by the prohibitions of the constitution, can
798 this court intervene." (quotation *798 marks omitted)); *see also* 35-A M.R.S. § 1302(2).

A. Health and Safety

[¶ 7] The Legislature has charged the Public Utilities Commission with the responsibility of regulating public utilities in Maine as part of the establishment of an overall regulatory system for public utilities operating in this state:

> The purpose of this Title is to ensure that there is a regulatory system for public utilities in the State that is consistent with the public interest and with other requirements of law and to provide for reasonable licensing requirements for competitive electricity providers. The basic purpose of this regulatory system is to ensure safe, reasonable and adequate service and to ensure that the rates of public utilities are just and reasonable to customers and public utilities.

35-A M.R.S. § 101; *see also* 35-A M.R.S. § 103 (establishing the Public Utilities Commission and providing that the Commission "shall regulate public utilities in accordance with this Title"). Thus, one of the Commission's core regulatory responsibilities is to ensure that public utilities provide "safe, reasonable and adequate service" to customers, *id.* § 101.

[¶ 8] Friedman's complaint asserted that the fees CMP levied against customers opting out of the smart meter program are unjust and discriminatory, and requested that the Commission open an investigation to address both the safety of exposure to RF radiation emitted by smart meters and the privacy and electronic trespass concerns that Friedman contends the Commission had not adequately considered in the Opt-Out Orders. Section 1302 provides for the filing of complaints against a public utility:

> When a written complaint is made against a public utility by 10 persons aggrieved that the rates, tolls, charges,

> schedules or joint rate or rates of a public utility are in any respect unreasonable or unjustly discriminatory; that a regulation, measurement, practice or act of a public utility is in any respect unreasonable, insufficient or unjustly discriminatory; or that a service is inadequate or cannot be obtained, the commission, being satisfied that the petitioners are responsible, shall, with or without notice, investigate the complaint.

35-A M.R.S. § 1302(1). Section 1302(2) provides for the dismissal of such complaints "if the commission is satisfied that the utility has taken adequate steps to remove the cause of the complaint or that the complaint is without merit."

[¶ 9] The Commission, exercising its authority under section 1302, dismissed Friedman's complaint by concluding that CMP "has taken and is taking adequate steps to remove the cause of the Complaint" because the issues raised in the portions of the complaint directed at CMP[4] had been "considered" and "resolved" in the Opt-Out Investigation, and CMP was implementing the directives in the Opt-Out Orders. Aug. 31 Order, at 5. The Commission explained:

799 > *799 The Opt-Out Investigation resulted in the Opt-Out Orders whereby the Commission ordered CMP to institute an opt-out option for consumers. The opt-out option addresses in a comprehensive way the issues raised by the Opt-Out Investigation complainants. All of the issues raised by the complainants in this matter were raised by one or more of the complainants in the Opt-Out Investigation and were considered by the Commission and resolved during that investigation or in subsequent orders on motions for reconsideration. CMP is currently implementing the directives contained in the Opt-Out Orders and the orders on reconsideration; thus, CMP has taken and is taking adequate steps to remove the cause of the Complaint filed by Ed Friedman, et al. Accordingly, the Complaint is dismissed as to CMP. As to the portions of the Complaint directed at the Commission, there is no statutory basis for a complaint of this type. Title 35-A M.R.S.A. § 1302 allows ten or more persons aggrieved by a public utility to make a written complaint *against that utility.* There is no mechanism in Section 1302 for such a complaint against the Commission itself. Accordingly, because there is no statutory basis for the Complaint insofar as the Complaint is directed at the Commission, the portions of the Complaint directed at the Commission are dismissed as without merit.[5]

Id. Contrary to the Commission's conclusion, we are not persuaded that Friedman's health and safety concerns were "resolved" by the Opt-Out Orders such that CMP's implementation of the opt-out alternatives removes the cause of Friedman's complaint.

[¶ 10] To support its conclusion regarding Friedman's health and safety concerns, the Commission cites to an earlier order denying a motion for reconsideration of the Opt-Out Orders. *Id.* at 4; *see Order Denying Reconsideration,* Nos. 2010-345, 2010-389, 2010-398, 2010-400, 2011-085, Order (Me.P.U.C. Aug. 24, 2011) [hereinafter Aug. 24 Order]. The motion for reconsideration had urged the Commission to consider new health information regarding RF radiation that had not been available during the Opt-Out Investigation. The Commission concluded that the health and safety concerns raised in that motion did not "warrant reconsideration of [the Commission's] conclusions as to smart meters" because "the appropriate entity to consider potential RF health impacts is the [Federal Communications Commission] in consultation with the Food and Drug Administration." Aug. 24 Order, at 5. Yet, nowhere in
800 the Aug. 24 Order, nor in the notices of the Opt-Out Investigation, nor in its other orders[6] addressing this issue, did the *800 Commission conclude that smart meter technology is not a credible threat to the health and safety of CMP's customers. In fact, the Commission explicitly declined to decide this issue in the Opt-Out Investigation: "In initiating this investigation, we make no determination on the merits of health, safety, privacy or security concerns, the adequacy of existing studies or which federal or state agency has the jurisdiction to make these determinations and this investigation will not include such matters." Jan. 7 Notice of Investigation, at 7. Furthermore, although in Part II of the Opt-Out Orders the Commission referenced an examination conducted by the Maine Center for Disease Control that concluded there was no "consistent or convincing evidence to support a concern for health effects related to the use of radiofrequency in the range of frequencies and power used by smart meters," the Commission ultimately reiterated its earlier statement that "it is making no determination on the merits of health, safety, privacy or security concerns with respect to wireless smart meters." Opt-Out Order Part II, at 6-7.

[¶ 11] The Commission's previous decisions demonstrate that it may have *considered,* to a limited extent, the health and safety issues Friedman raised, but it did not *resolve* those issues. Because the Commission explicitly declined to make determinations on the merits of the health and safety concerns raised by the complainants in the Opt-Out Investigation, the Commission's decision in this proceeding to treat those issues as "resolved" by that prior investigation was in error. Having never determined whether smart-meter technology is safe, the Commission is in no position to conclude in this proceeding that requiring customers who elect either of the opt-out alternatives to pay a fee is not "unreasonable or unjustly discriminatory," 35-A M.R.S. § 1302(1), such that a
801 complaint raising those issues should be summarily dismissed.[7] We therefore vacate *801 the portion of the Commission's dismissal of Friedman's complaint that was directed at CMP and addressed health and safety concerns.

B. Privacy, Trespass, and Fourth Amendment

[¶ 12] With respect to the privacy, trespass, and Fourth Amendment issues raised by Friedman and directed at CMP, the Commission's dismissal of these aspects of the complaint was not in error. In this portion of the dismissal order, the Commission again cited previous decisions related to the Opt-Out Investigation that addressed these issues, but here it is clear that those issues were resolved. *See* Aug. 31 Order, at 4-5. To the extent Friedman's complaint raises property rights concerns, the Commission previously resolved this issue in the Feb. 18 Notice of Investigation:

> Pursuant to [35-A M.R.S. § 304 (2011)], all public utilities are required to file their [Terms and Conditions of Service] with the Commission. Under the [Terms and Conditions] filed by CMP, CMP has the right to select the type and make of metering equipment, and may, from time to time, change or alter the equipment.... Further, CMP has the right to access a customer's property and premises for "the purpose of reading meters, or inspection and repair of equipment used in connection with its energy, or removing its property, or for any other purpose." ...
>
> CMP's rights to access the property of its customers in conjunction with the installation, repair, or replacement of its meters is clear. Indeed, customers agree to allow this access by virtue of their agreement to purchase service from CMP.

Feb. 18 Notice of Investigation, at 4. Another Commission decision also previously concluded that statutory and common law trespass concerns had no merit[8] and that the Commission did not have jurisdiction to address complainants' constitutional claims against CMP.[9] *Order Denying Motion for Reconsideration*, No. 2010-400, Order, at 2-5 (Me.P.U.C. Apr. 15, 2011). Thus, with
802 respect to the privacy, trespass, *802 and Fourth Amendment issues raised by Friedman and directed at CMP, the Commission did not abuse its discretion when it dismissed that portion of the complaint. The Commission had previously addressed and resolved those concerns during the Opt-Out Investigation, and CMP's implementation of the Opt-Out Orders resulting from that investigation removed the cause of these aspects of the complaint.

C. Constitutional Claims

[¶ 13] Finally, Friedman also raises several constitutional claims directed at the Commission, including allegations that the Opt-Out Orders violate the Fourth and Fifth Amendments of the United States Constitution, and article I of the Maine Constitution. However, section 1302 authorizes complaints against public utilities only and is not, therefore, a proper mechanism to assert a violation of constitutional rights resulting from an earlier, final decision of the Commission. *See* 14 M.R.S. §§ 5951-5963 (2011) (Uniform Declaratory Judgments Act). The constitutional claims made against the Commission in Friedman's complaint were properly dismissed as without merit. Friedman's request for a stay pending further development of the constitutional questions is therefore moot.

The entry is:

Judgment vacated with respect to the portions of the complaint addressing health and safety issues directed at Central Maine Power, and affirmed in all other respects. Remanded to the Maine Public Utilities Commission for further proceedings consistent with this opinion.

[1] CMP proposed providing "solid-state meters or meter modules for all 550,000 of its customer accounts, supported by a two-way communications network and a meter data management system." *Order Approving Installation of AMI Technology*, No. 2007-215(II), Order, at 1 (Me.P.U.C. Feb. 25, 2010). The stated benefits associated with the project included both operational savings, such as reduced meter reading costs, and supply-side savings through "demand response programs and time-of-use (TOU) pricing." *Id.*

[2] The complaints were filed pursuant to 35-A M.R.S. § 1302 (2011).

[3] The two alternatives are: "(a) An electro-mechanical meter (likely the customer's existing meter)" or "(b) A standard wireless 'smart meter' with the internal network interface card (NIC) operating in receive-only mode." *Order (Part I)*, Nos. 2010-345, 2010-389, 2010-398, 2010-400, 2011-085, Order, at 2 (Me.P.U.C. May 19, 2011) [hereinafter Opt-Out Order Part I]. The charges include both a one-time charge and a recurring monthly charge. *Id.* at 3. The order also provided for a reduction in charges for low-income customers and a customer communication plan through which CMP will inform customers of the options available. *Id.* at 3-4.

[4] Regarding the portions of Friedman's complaint directed at the Commission, the Commission concluded, "there is no statutory basis for a complaint of this type," citing section 1302, and dismissed those portions of the complaint as well. *Order Dismissing Complaint*, No. 2011-262, Order, at 5 (Me.P.U.C. Aug. 31, 2011) [hereinafter Aug. 31 Order]. Friedman does not appeal the portion of the Commission's decision dismissing the health and safety and privacy allegations directed at the Commission, and we see no error in this aspect of the Commission's decision.

[5] In its decision, the Commission noted that the issues raised by Friedman regarding the World Health Organization's press release and reclassification were not new, as that information had been presented in and considered with an earlier motion to reconsider filed by another group of CMP customers and that motion had been denied. Aug. 31 Order, at 4; *see also Order Denying Reconsideration*, Nos. 2010-345, 2010-389, 2010-398, 2010-400, 2011-085, Order, at 3 (Me.P.U.C. Aug. 24, 2011). The Commission also noted that the privacy, trespass, and Fourth

Amendment issues raised by Friedman had all been addressed in previous decisions of the Commission. Aug. 31 Order, at 4-5.

[6] A prior decision, cited by the Commission in the order dismissing Friedman's complaint, demonstrates that the Commission declined to determine the health and safety issues:

It is impossible for the Commission to decide that smart meters are safe, or unsafe, without first reaching a conclusion regarding the health effects of RF. Consistent with our prior decisions in [related proceedings], under the doctrine of primary jurisdiction the Commission is not the appropriate entity to consider potential health effects from RF related to the smart meter installations given that the [Federal Communications Commission] is the federal agency charged with determining RF-related emission standards and the Commission does not have institutional expertise regarding potential RF health impacts.... Accordingly, we decline to widen the scope of our investigation to include the "RF safety" of smart meters.

Order Denying Motion for Reconsideration, No. 2010-400, Order, at 6 (Me.P.U.C. Apr. 15, 2011) [hereinafter Apr. 15 Order].

In addition, when a complainant whose complaint had been consolidated into the Opt-Out Investigation moved for reconsideration — based in part on the Commission's decision not to address, among other issues, the health and safety of the AMI technology — the Commission denied the motion concluding:

In our view, options intended to address health concerns among CMP's customers are being adequately examined in our opt-out investigation. Consequently, there is nothing in law that would compel the Commission to expend the substantial amount of resources that would be necessary to create a forum for the debate and resolution of issues regarding the health impacts of wireless smart meters or to find another body to conduct such an investigation beyond the studies of the potential health impacts currently underway, and we decline to do so. Accordingly, we will not reconsider our initial decision to consolidate [this complaint] into our smart meter opt-out investigation without expanding that investigation (or initiating a separate investigation) to include a forum for the resolution of health impact issues.

Order Denying Motion for Reconsideration, No. 2010-398, Order, at 4 (Me.P.U.C. Apr. 7, 2011).

[7] Although the Commission may not have the technical expertise necessary to conduct an independent investigation on this issue, the Commission's orders appear to recognize that other state and federal agencies do. As an administrative body authorized to conduct hearings and engage in fact-finding, the Commission is not precluded from considering the findings and conclusions of other state and federal agencies. *See* 9 C.M.R. 65-407 110-30 § 927 (1996) ("The Commission or the presiding officer may take official notice of any facts of which judicial notice could be taken and, in addition, may take official notice of general, technical and scientific matters within their specialized knowledge, and of statutes, regulations and nonconfidential agency records.").

[8] The Commission denied a motion for reconsideration that had alleged violations of several Maine statutes: 17-A M.R.S. § 402(1) (2011) (criminal trespass), 17-A M.R.S. § 511 (2011) (criminal violation of privacy), 5 M.R.S. § 4682 (2011) (violations of constitutional rights; civil actions by aggrieved persons), 14 M.R.S. § 7551-B (2011) (trespass damages), 33 M.R.S. § 458 (2011) (easements or rights-of-way; installation of utility services), 35-A M.R.S. § 2520 (2011) (affixing wires and structures; consent of building owner required), and 35-A M.R.S. § 3136 (2011) (transmission and distribution utilities have eminent domain; approval). Apr. 15 Order, at 2-4. The Commission's order clearly addressed how and why each statute did not apply to the AMI project. *Id.* In addition, the Commission also concluded that the "RF trespass claim," in which the complainants alleged "trespass of radiofrequency into the home," was without merit because "any such trespass would be considered to be an `intangible trespass.'" *Id.* at 5.

[9] The Commission concluded:

The [complaint] alleges that in allowing RF to enter homes, CMP has violated the 4th, 5th, and 14th Amendments to the United States Constitution. Claims for violations of rights guaranteed by the federal Constitution may be brought pursuant to 42 U.S.C. § 1983....

The Commission does not have the jurisdiction to bring a suit under Section 1983 on behalf of the Complainants.

Apr. 15 Order, at 4-5.

Exhibit No. 11

Kyle vs. Southern California Edison **30-2011-00513876-SC-CJC (Small Claims)**

SUPERIOR COURT OF CALIFORNIA,
COUNTY OF ORANGE
CENTRAL JUSTICE CENTER

MINUTE ORDER

DATE: 02/21/2012 TIME: 04:46:00 PM DEPT: C20

JUDICIAL OFFICER PRESIDING: David Chaffee
CLERK: Cora Bolisay
REPORTER/ERM:
BAILIFF/COURT ATTENDANT: Schallie Valencia

CASE NO: **30-2011-00513876-SC-SC-CJC** CASE INIT.DATE: 10/11/2011
CASE TITLE: **Kyle vs. Southern California Edison**
CASE CATEGORY: Small Claims CASE TYPE: Small Claims

EVENT ID/DOCUMENT ID: 71421757
EVENT TYPE: Small Claims Trial

APPEARANCES

There are no appearances by any party.

Trial de Novo on the appeal of the small claims court's determination having been held, and the matter having been argued and submitted, the Court now finds and orders as follows:

The Court finds judgment for David Kyle against Southern California Edison in the amount of: $2500.00 damages, $50.00 costs, and $0 attorney fees.

In lieu of payment and at the election of defendant, defendant may, not later than March 12, 2012, replace the "smart meter" installed at the Kyle residence with the same type of meter previously in place at the Kyle residence prior to the installation of the "smart meter." Counsel for SCE and Mr. Kyle shall confirm in writing to the Clerk of Department C-20 no later than March 16, 2012, as to what SCE's election was and, assuming that SCE elects to replace the meter, whether or not the replacement was accomplished on or before March 12, 2012. If the meter is timely replaced, then Plaintiff shall have judgment for costs only.

Case is ordered remanded to the Small Claims Court for enforcement of judgment.

Court orders Clerk's Office to give notice.

David Kyle
3941 S. Bristol St., Ste D520
Santa Ana, CA 92704

Southern California Edison
PO Box 900
Rosemead, CA 91770

I certify that I am not a party to this action and that this notice was mailed in accordance with Section 1013a of the Code of Civil Procedure. A copy of the Notice of Entry of Judgment/Ruling Small Claims Appeal was deposited in the United States mail, in a sealed envelope with postage fully prepaid addressed as shown above. The mailing and this certification occurred at *(place)*Santa Ana California, on *(date)* February 23, 2012.

Alan Carlson, Clerk of the Court

By ehong _____
. Deputy Clerk

Catherine J Frompovich
23 Cavendish Drive, Ambler, PA 19002
215-653-7575

January 20, 2017

Certification of Frompovich Brief due January 25, 2017
Posted U.S. Postal Service January 20, 2017

***Catherine J Frompovich v. PECO Energy Company*, C-2015-2474602**

Certified Mail * Return Receipt Requested
Rosemarie Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth of Pennsylvania
400 North Street, Second Floor
Harrisburg, PA 17120

First Class USPS Mail with Tracking copies to:
Administrative Law Judge Darlene D Heep
Administrative Law Judge Christopher P Pell
Pennsylvania Public Utility Commission
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Respectfully submitted by,

Catherine J Frompovich

Catherine J Frompovich, *Pro Se*

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Catherine J. Frompovich	:	
	:	Docket No. C-2015-2474602
	:	
v.	:	
	:	
PECO Energy Company	:	

CERTIFICATE OF SERVICE

I, Catherine J. Frompovich, hereby certify that I have this day served a copy of my Brief due January 25, 2017 to the following via

Certified Mail * Return Receipt Requested to:

Rosemarie Chiavetta, Secretary
Pennsylvania Public Utility Company
Commonwealth of Pennsylvania
400 North Street, Second Floor
Harrisburg, PA 17120

And by First Class U.S. Postal Service with Tracking mail to:

Administrative Law Judge Darlene D Heep
Administrative Law Judge Christopher P Pell
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Dated at Ambler, Pennsylvania, January 20, 2017

Catherine J. Frompovich

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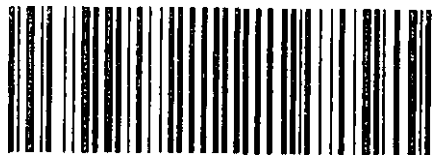

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CMPC