

Jan 9 2020

Secretary
PA Public Utility Commission
400 North St.

Commonwealth Keystone Bldg 2nd FL.
Harrisburg, PA 17120

RE: Sharon Landis vs PPL C-2018-3002142

Attached are exceptions to the Dec 19, 2019
Initial Decision in this case by Judge
Elizabeth H. Barnes

Copy was also sent to:

1. Judge Elizabeth Barnes (Hand Delivered)
2. Devin Ryan, Atty
Post & Schell

RECEIVED
PA PUC
SECRETARY'S BUREAU
FRONT DESK

2020 JAN 10 PM 3:22

RECEIVED

Sharon Landis

EXCEPTIONS TO INITIAL DECISION
dated Dec 19, 2019

ITEM #

1. An over-10-year National Institute of Health indicates otherwise. This report of March 2018 is the largest, most recent live animal study. The study also indicates changes in male rats prostate gland, liver, pancreas cells. Both male & female rats had abnormal growth in the right side of the heart. There was genetic damage in both male & female rodents.

See items 1-a, 1-b, 1-c + 1-d

2. Same as #1 reply

3. Same as #1 + 2 reply

4. The newer, more powerful meter could be unsafe for me.

5. I believed PPL would terminate my service because they said they would terminate my service -

RECEIVED

JAN 10 2020

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

by notices hung on my door & in person ^{SHARON LANDIS} on May 23, 2018 in person if I did not get the meter replaced.

6. I may not have an engineering or medical degree, but at over 40 years of age and years of observation, experience, detective work, research, etc. I am an expert on Sharon Landis. I am

the best source of information as to how EMF affects me: how much, when, where, under what conditions, etc.

As in other medical conditions one cannot always pinpoint an exact time symptoms started, but one gradually notices changes & concludes something is amiss. This does not mean symptoms aren't credible.

The Trac Phone mentioned is for emergency only and is rarely turned on. The amount of time it would actually be against my head would probably

about $\frac{1}{2}$ hr a year. I do not "chat" on a cell phone.

As to possibility of Broadcast towers causing these symptoms - if that were the case I would have these symptoms all the time. I do not.

7. AT no time have I indicated asthma as one of the symptoms I experience around RF. The medical report referred to was to verify I have asthma - (there was questioning by PPL whether I even had asthma) & applied only to the shut-off issue - & it's affect on my health.

8. refer to #1.

9. Most animal studies are done in this manner. What may be 'normal' standards for the general public may be a problem for a EMF Sensitive person. Most of the general public can eat peanuts, but to a person hypersensitive to peanuts 1 peanut could be life-threatening.
10. At no time did I report fatigue and lethargy as a symptom
11. At no time have I claimed asthma as a symptom to RF exposure.
12. Refer to NHT Study in #1. many of studies cited in this paragraph are old. (2004, 2014, 2016)
Persons with pacemakers are

are instructed to keep cell phones away from their pacemakers. Cell phones have been around a little more than 20 years and we are probably now starting to see some of the health affects

13. NIH study indicates otherwise

14. see page 6

15. There must be some safety issues regarding RF or no guidelines would be needed. My cell phone safety instructions say to keep the cell phone a certain distance from the body. There is a strong warning to keep cell phone away from pacemakers and any other implanted electrical device. Again what may be safe for general public may not be safe for a hypersensitive

Sharon handic
person. Asbestos was once considered safe.

14. I do not have any of the following in my home because of my symptoms around some electric items.

- no smart phone
- no computers or tablets
- no Bluetooth anything
- no wireless security system
- no smart speakers
- no garage door opener
- no baby monitor, walkie talkie, etc.
- no wifi network
- no wireless router

16. If my symptoms were coming from background levels of broadcast towers, they would be evident all the time & when I went outside, for a walk, etc. They are not. The symptoms

are in specific areas of the meter wall.

17. It is not known if or what symptoms would be increased by a stronger meter w/ a stronger magnetic field.

18. When a ^{meter related} shut-off would cause health issues, this issue should be carefully considered.

19. Because there are currently no tests for EMF sensitivity it is very hard to prove a condition exists. But that does not mean it does not exist. There are other conditions hard to prove at times. For example: To my knowledge there is currently no test

Sharon Landis

(except an after death study of the brain)
to prove one has Alzheimers. Yet
in the early stages, self-reported
symptoms indicate something is amiss
to a diagnosis is made.

Sharon Landis
Jan 9, 2020

RECEIVED

JAN 10 2020

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Sharon Landis

v.

PPL Electric Utilities Corporation

:
:
:
:
:
:

C-2018-3002142

INITIAL DECISION

Before
Elizabeth H. Barnes
Administrative Law Judge

INTRODUCTION

A residential customer filed a complaint seeking to prevent an electric distribution company (EDC) from installing a smart meter a/k/a “Advanced Metering Infrastructure (AMI) meter” or “Radio Frequency (RF) meter” at her residence for health and safety reasons, and during the hearing Complainant requested to “opt-out” of smart meter installation. The complaint will be dismissed for failure to prove by a preponderance of evidence that the installation of the smart meter constitutes unsafe or unreasonable service under 66 Pa. C.S. § 1501 or otherwise violates the Public Utility Code, a Commission order or regulation or a Commission-approved tariff of the company.

HISTORY OF THE PROCEEDING

On May 23, 2018, Sharon Landis (Complainant) filed the instant Complaint with the Pennsylvania Public Utility Commission (Commission) against PPL Electric Utilities Corporation (PPL or Respondent) averring she wished to opt out of a smart meter installation at her residence, 1809 Letchworth Drive, Camp Hill, Cumberland County, Pennsylvania (account number ending in

005) for health reasons and requesting a directive that PPL be precluded from terminating her electric service or, alternatively, a two-month period at minimum to explore other options.

The Complaint was served upon PPL on May 23, 2018. On June 12, 2018, Respondent filed an Answer. The Answer admitted that the Respondent provides electric service to the Complainants at the address listed on the Complaint. The Answer contends that the Respondent is required to install AMI, or smart meters, for all automatic meter reading (AMR) customers and that it has the right to terminate service for failure of the customer to permit access to the meter.

On June 15, 2018, a Hearing Notice was issued scheduling a hearing for July 17, 2018 before Administrative Law Judge Benjamin Myers. On June 20, 2018, a Change Notice was issued rescheduling the hearing to November 1, 2018 and reassigning the case to me as presiding officer. On June 22, 2018, a Prehearing Order was issued. On October 16, 2018, PPL requested a continuance of the hearing due to the unavailability of one of its witnesses. On October 22, 2018, the hearing was rescheduled to April 16, 2019. On or about April 8, 2019, Complainant verbally requested continuance of the hearing. The request was unopposed by PPL, so the April 16, 2019 hearing was continued to October 9, 2019. On August 2, 2019, a Third Prehearing Order was issued. On September 18, 2019, PPL requested a third continuance due to the unavailability of one of its witnesses. On September 20, 2019, a Call-In Telephonic Hearing Change Notice was issued, and the hearing was rescheduled to October 17, 2019. On October 15, 2019, Complainant requested a fourth continuance. PPL objected to the fourth continuance. On October 16, 2019, an Order Denying Continuance was issued. On October 17, 2019, the hearing was held as scheduled.

At the hearing, Complainants appeared *pro se* with five exhibits pre-marked A-E. Respondent appeared represented by Devin Ryan, Esquire, and Curtis Renner, Esquire with 15 exhibits and four witnesses: Kevin Durkin, Donald Vinciguerra, Christopher Davis, Ph.D., and Mark Israel, M.D. All statements and exhibits were admitted into the record.

A transcript consisting of 65 pages was filed on November 14, 2019 and the record closed the same day. This case is ripe for a decision.

FINDINGS OF FACT

1. The Complainant in this proceeding is Sharon Landis (Complainant), who resides at 1809 Letchworth Drive, Camp Hill, Cumberland County, Pennsylvania (service property). N.T. 5.

2. The Respondent in this proceeding is PPL Electric Utilities Corporation, an electric distribution company (EDC). N.T. 8-9.

3. On June 30, 2014, PPL filed its new Smart Meter Plan intended to comply with all the requirements of Act 129 and the Commission's Smart Meter Implementation Order. PPL Electric Statement No. 4 at 4.

4. PPL selected Radio Frequency ("RF") Mesh meters and metering system because the Company determined that the RF Mesh system would support the 15 capabilities required by Act 129 and the Smart Meter Implementation Order. PPL Electric Statement No. 4 at 4.

5. The individual RF Mesh meters are used as relay points to transmit data back to PPL. PPL Electric Statement No. 4 at 5-6.

6. Under the Smart Meter Plan, the RF Mesh meters are to be deployed between 2017 and 2019 for all of PPL's 1.4 million customers. PPL Electric Statement No. 4 at 6.

7. PPL had deployed over one million RF Mesh meters as of the September 19, 2019 hearing and none of them has caused a fire. PPL Electric Statement No. 4 at 10.

8. The RF Mesh meter to be installed at the service property is the Landis + Gyr Focus AXR-SD meter. PPL Electric Statement No. 4 at 5-6.

9. The Landis + Gyr Focus AXR-SD meter is certified by the Underwriters Laboratories at UL 2735. PPL Electric Statement No. 4 at 8.

10. The Landis + Gyr Focus AXR-SD meter is compliant with the American National Standards Institute (ANSI). PPL Electric Statement No. 4 at 8.

11. PPL Witness Davis has a Ph.D. in Physics and is a fulltime Professor with an endowed Chair at the University of Maryland, where for over 30 years he has taught Physics, Electrical Engineering, Electromagnetics, and RF Electromagnetics to undergraduate and graduate students. PPL Electric Statement No. 1 at 1-5.

12. In addition to his teaching, Dr. Davis is an active scientific researcher in the fields of Physics, Biophysics, Electrical Engineering, Bioelectromagnetics and RF Bioelectromagnetics, conducting many scientific studies in these fields and publishing over 250 studies in peer-reviewed scientific journals. PPL Electric Statement No. 1 at 1-5.

13. Dr. Davis conducted a substantial amount of research on RF fields of the type produced by the AMI meters being used by PPL. PPL Electric Statement No. 1 at 3.

14. RF fields are part of the lower energy, non-ionizing portion of the electromagnetic spectrum which consists of lower frequency signals that do not have enough energy to break chemical bonds in cells or DNA. PPL Electric Statement No. 1 at 5-6.

15. RF fields come from many sources in our everyday environments, including AM/FM radio, television broadcast, cell phones and their communication networks, portable phones, garage door openers and Wi-Fi networks. PPL Electric Statement No. 1 at 5-7, 14.

16. The Federal Communications Commission (FCC) has determined safe public exposure levels for RF fields from devices that transmit RF signals, such as the AMI meters. PPL Electric Statement No. 1 at 9-10.

17. The FCC safe public exposure limits are based on evaluations of the body of scientific research on RF fields and were adopted in consultation with other federal agencies, including the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA). PPL Electric Statement No. 1 at 9-10.

18. The levels of RF fields from the Landis + Gyr Focus AXR-SD AMI meters are 98,000 times lower than the RF exposure safety limits established by the FCC. PPL Electric Statement No. 1 at 13, PPL Electric Exhibit CD2.

19. RF signals from the AMI meter are of very short duration and will occur for only a total of 84 seconds over a 24-hour period. PPL Electric Statement No. 1 at 7.

20. There are six television broadcast towers within a 50 mile radius of Complainants' residence in Camp Hill, Pennsylvania. PPL Electric Statement No. 1 at 15.

21. Based on the locations of each tower and their RF power outputs, the constant background level of RF fields at Complainants' residence are 111 times higher than the RF signals from the AMI meter at 3 meters distance. PPL Electric Statement No. 1 at 15, PPL Electric Exhibit CD-5.

22. The RF exposure from a cell phone used at a person's head is 260,000 times higher than the average RF levels one meter away from the Company's new smart meter. PPL Electric Statement No. 1 at 14.

23. PPL Witness Israel received his undergraduate degree from Hamilton College and his medical degree from the Albert Einstein College of Medicine, and he completed his medical training at Harvard Medical School. PPL Electric Statement No. 2 at 1.

24. Dr. Israel is a Professor of Medicine, Pediatrics, and Molecular and Systems Biology at the Dartmouth Medical School and the Executive Director of the Israel Cancer Research Fund in New York, an international charitable fund for medical and scientific research programs. PPL Electric Statement No. 2 at 1.

25. Dr. Israel is board certified and licensed to practice medicine. PPL Electric Statement No. 2 at 3.

26. Dr. Israel has conducted medical research for 40 years in a wide variety of areas, including systems biology, biochemistry, cell biology, cancer, molecular biology, and molecular genetics and has published over 245 medical research studies in leading peer-reviewed scientific journals. PPL Electric Statement No. 2 at 3-4.

27. Dr. Israel has taught medicine and science for more than 30 years to medical students, graduate students, interns, residents, and practicing physicians in a number of fields, including endocrinology, immunology, hematology, neurology, cardiology, biochemistry, cell biology, genetics, molecular genetics, medical oncology, and radiation oncology. PPL Electric Statement No. 2 at 3.

28. Claimed symptoms related to Electromagnetic Hypersensitivity (EHS) are more accurately described as "Idiopathic Environmental Intolerance" (IEI), in which "idiopathic" means "cause unknown," rather than electromagnetic hypersensitivity. PPL Electric Statement No. 2 at 13.

29. There are no established medical criteria for the diagnosis or treatment of IEI. PPL Electric Statement No. 2.

① 30. IEI and the variety of symptoms attributed to it are not caused by exposure to RF fields. PPL Electric Statement No. 2 at 13.

② 31. The World Health Organization and a number of other public health authorities have concluded that the scientific research on RF exposures from cell phone use, which are far higher than the RF from PPL's smart meters, has not shown that RF fields cause adverse health effects. PPL Electric Statement No. 2 at 10-15, PPL Electric Exhibit MI-1.

32. Several U.S. state public health authorities also have investigated claims about health effects from smart meters and have concluded that there is no credible scientific

evidence that RF fields from smart meters will cause or contribute to any adverse health effects. PPL Electric Statement No. 2 at 11, PPL Electric Exhibit MI-2.

33. Complainant is neither a medical professional nor an engineer. N.T. 19.

DISCUSSION

Legal Standards

Under Section 332(a) of the Public Utility Code, 66 Pa. C.S. § 332(a), “the proponent of a rule or order has the burden of proof.” It is well-established that “[a] litigant’s burden of proof before administrative tribunals as well as before most civil proceedings is satisfied by establishing a preponderance of evidence which is substantial and legally credible.” *Samuel J. Lansberry, Inc. v. Pa. Pub. Util. Comm’n*, 578 A.2d 600, 602 (Pa. Cmwlth. 1990). The preponderance of evidence standard requires proof by a greater weight of the evidence. *Commonwealth v. Williams*, 557 Pa. 207, 732 A.2d 1167 (1999). This standard is satisfied by presenting evidence more convincing, by even the smallest amount, than that presented by another party. *Brown v. Commonwealth*, 940 A.2d 610, 614 n.14 (Pa. Cmwlth. 2008).

If the party seeking a rule or order from the Commission sets forth a *prima facie* case, then the burden shifts to the opponent. *MacDonald v. Pa. R.R. Co.*, 348 Pa. 558, 36 A.2d 492 (1944). Establishing a *prima facie* case requires either evidence sufficient to make a finding of fact permissible or evidence to create a presumption against an opponent which, if not met, results in an obligatory decision for the proponent. Once a *prima facie* case has been established, if contrary evidence is not presented, there is no requirement that the party seeking a rule or order from the Commission must produce additional evidence to sustain his or her burden of proof. See *Replogle v. Pa. Elec. Co.*, 54 Pa. PUC 528, 1980 Pa. PUC LEXIS 20 (Order entered Oct. 9, 1980); see also *Dist. of Columbia’s Appeal*, 21 A.2d 883 (Pa. 1941); *Application of Pennsylvania-American Water Co. for Approval of the Right To Offer, Render, Furnish or*

Supply Water Serv. to the Pub. in Additional Portions Of Mahoning Twp., Lawrence County, Pa., Docket No. A-212285F0148, 2008 Pa. PUC LEXIS 874 (Order entered Oct. 29, 2008).¹

3. In addition, a person does not sustain his or her burden of proof in an electric and magnetic field exposure case when the record evidence, "taken as a whole, leads to the ultimate finding and conclusion that the scientific studies at present are inconclusive." *Letter of Notification of Phila. Elec. Co. Relative to the Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties*, 1992 Pa. PUC Lexis 160, at *210-11 (June 29, 1992) (Initial Decision) ("*Woodbourne-Heaton*"). Rather, the person must demonstrate by a preponderance of the evidence that such exposure actually causes adverse health effects. *Id.* at *211. Specifically, in AMI meter-related matters, the Commission has held that "[t]he Complainant will have the burden of proof during the proceeding to demonstrate, by a preponderance of the evidence, that [the utility] is responsible or accountable for the problem described in the Complaint." *Kreider v. PECO Energy Co.*, Docket No. P-2015-2495064, p. 18 (Order entered Sept. 3, 2015); *see also Romeo v. Pa. Pub. Util. Comm'n*, 154 A.3d 422, 429 (Pa. Cmwlth. 2017) (finding that the smart meter complainant should have a hearing to try to prove his claim through "the testimony of others as well as other evidence that goes to that issue.")

Section 701 of the Public Utility Code provides that "any person . . . having an interest in the subject matter . . . may complain in writing, setting forth any act or thing done or omitted to be done by any public utility in violation, or claimed violation, of any law which the commission has jurisdiction to administer, or of any regulation or order of the commission." 66 Pa. C.S. § 701. Therefore, a complainant must generally demonstrate that the public utility violated the Public Utility Code or a Commission regulation or order.

¹ In addition, any finding of fact necessary to support an adjudication of the Commission must be based upon substantial evidence. *Met-Ed Indus. Users Grp. v. Pa. Pub. Util. Comm'n*, 960 A.2d 189, 193 n.2 (Pa. Cmwlth. 2008) (citing 2 Pa.C.S. § 704). Substantial evidence is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion. *Borough of E. McKeesport v. Special/Temporary Civil Serv. Comm'n*, 942 A.2d 274, 281 n.9 (Pa. Cmwlth. 2008) (citation omitted). Although substantial evidence must be "more than a scintilla and must do more than create a suspicion of the existence of the fact to be established," *Kyu Son Yi v. State Bd. of Veterinary Med.*, 960 A.2d 864, 874 (Pa. Cmwlth. 2008) (citation omitted), the "presence of conflicting evidence in the record does not mean that substantial evidence is lacking." *Allied Mech. and Elec., Inc. v. Pa. Prevailing Wage Appeals Bd.*, 923 A.2d 1220, 1228 (Pa. Cmwlth. 2007) (citation omitted).

The Commission has exclusive jurisdiction to adjudicate “issues involving the reasonableness, adequacy, and sufficiency” of a public utility’s facilities and services. *See Elkin v. Bell of Pa.*, 420 A.2d 371, 374 (Pa. 1980) (citations omitted). Section 1501 of the Public Utility Code states, in pertinent part, that:

Every public utility shall furnish and maintain adequate, efficient, safe, and reasonable service and facilities, and shall make all such repairs, changes, alterations, substitutions, extensions, and improvements in or to such service and facilities as shall be necessary or proper for the accommodation, convenience, and safety of its patrons, employees, and the public. Such service also shall be reasonably continuous and without unreasonable interruptions or delay. Such service and facilities shall be in conformity with the regulations and orders of the commission. Subject to the provisions of this part and the regulations or orders of the commission, every public utility may have reasonable rules and regulations governing the conditions under which it shall be required to render service. . .

4

66 Pa. C.S. § 1501.

When presented with a challenge to an AMI meter installation, the Commission has pronounced that “[t]he ALJ’s role . . . will be to determine based on the record in this particular case, whether there is sufficient evidence to support a finding that the Complainant was adversely affected by the smart meter or whether [the utility’s] use of a smart meter will constitute unsafe or unreasonable service in violation of Section 1501 under the circumstances in this case.” *Kreider v. PECO Energy Co.*, Docket No. P-2015-2495064 at 23 (Opinion and Order entered January 28, 2016) (citing *Woodbourne-Heaton*, 1992 Pa. PUC Lexis 160, at *12-13). *Frompovich v. PECO Energy Co.*, Docket No. C-2015-2474602 at 10 (Opinion and Order entered May 3, 2018) (*Frompovich*).

Health and Safety Concerns

Ms. Landis has resided at 1809 Letchworth Drive, Camp Hill, Pennsylvania and has received electric service from PPL since 1970. N.T. 8. Complainant filed a complaint because she believed PPL would terminate her electric service, which would affect her ability to use an air conditioner. Complainant has asthma and allergies, and she relies upon her air

5

conditioner to help her breathe. N.T. 9-10. She claims to be electromagnetic sensitive and has experienced heart palpitations when exposed to AMI meters. N.T. 19-21.

Disposition

6. Complainant has no engineering or medical degrees. N.T. 19. I find her testimony that she is experiencing negative health symptoms from her meter to be incredible. She could not pinpoint an exact time her symptoms such as agitation, heart palpitations and insomnia began. N.T. 20-21. Complainant is exposed to radio frequency fields from her Trac-phone and background levels from UHF Broadcast Towers within 50 miles of her residence in Camp Hill, which are 111 times higher than any radio frequency fields she would be exposed to at 3 meters distance from an AMI meter. N.T. 20-21, PPL Electric Statement No. 1 at 15.

7. Complainant has failed to show any health concerns such as anxiety, agitation, heart palpitations, insomnia, or asthma are likely to be caused, contributed to, or exacerbated by the AMI meter to be installed at her service property. Although Complainant offered testimony and articles in support of her argument including: Complainant Exhibit A: *Cell Phone Radio Frequency Radiation*; Complainant Exhibit C – a portion of a medical report showing on 5/23/18, she had a problem listed as Asthma; and Complainant Exhibit E – *Voices out of Nowhere*; this is insufficient evidence to meet the *prima facie* burden of proof to show PPL's service is unsafe or unreasonable.

8. There is insufficient evidence to show that any of these health conditions are caused by AMI meters installed close to her premises or would be exacerbated by the installation of an AMI meter at the service property. PPL Electric Statement No. 2 at 7. Complainant's lay opinion as to the probable health effects of radio frequency fields or electromagnetic fields emitting from an RF meter to be installed at her service property is non-persuasive. Further, the articles upon which she relies upon to prove her health claims in Exhibits A and E were authored by persons unavailable for cross-examination at the hearing. Exhibit A appears to be an unauthored news release or summary related to the Notational Toxicology Program (NTP) study involving radio frequency fields effects upon animals. N.T. 57, Complainant Exhibit A.

9. Conversely, Dr. Davis' testimony that the levels of radio frequency fields in the NTP study were many thousands of times higher than the exposures from a Landis + Gyr AMI meter is credible and persuasive. N.T. 58. Dr. Davis testified that the radio frequency fields emitted by an AMI meter are far below the current federal safety standards regarding exposure levels and that these standards protect the public. N.T. 59-60, PPL Electric Statement No. 1 at 7-16, Exhibits CD1-CD5.

I find the *Voices Out of Nowhere* article by Vincent H. Gaddis to be unpersuasive. First, Mr. Gaddis was unavailable to cross-examine. Second, the article was written in April 1948, and does not appear to be a scientific study. The article pertains to radio frequency technology as it was at that time. The article focused on appliances picking up radio broadcasts or telephone conversations. Thus, Complainant Exhibit E is unreliable hearsay evidence. The opinion of Complainant based upon the hearsay evidence in Exhibits A and E are non-persuasive.

10. Self-reported symptoms of electromagnetic hypersensitivity claimed to be caused by RF fields include: buzzing in ears, sleep disturbance, palpitations, nervousness, fatigue and lethargy. PPL Electric Statement No. 2 at 12-15. A "nocebo effect"² may present symptoms similar to those Complainant complains of in IEI-EMF and control participants; however, there is no reliable medical basis to conclude that RF fields from the AMI meters being installed by PPL would cause, contribute to, or exacerbate any of the symptoms of anxiety, heart palpitations, insomnia, or asthma claimed by Complainant, or any other adverse health effects. PPL Electric Statement No. 2 at 14-17.

11. There have been a number of studies that have examined whether RF fields at the frequencies used by cell phones affect heart rates (Tahvanainen 2004; Nam 2006; Choi 2014). In the Tahvanainen (2004) study, 32 human volunteers were exposed to RF at cell phone frequencies and their heart rates were compared to their rates when they were not given RF exposures. The study found no significant changes in heart rates when the subjects received RF

² A nocebo effect is said to occur when negative expectations of the patient regarding a treatment cause the treatment to have a more negative effect than it otherwise would have.

or sham exposures. In Choi (2014), the heart rates of the volunteer subjects were compared after exposure to RF fields at cell phone frequency and after sham exposures, the researchers found no significant effects on heart rates from RF exposure. PPL Electric Statement No. 2 at 15-16.

I am persuaded by the credible testimony of Dr. Israel, who testified claimed symptoms related to EHS are more accurately described as IEI in which "idiopathic" means "cause unknown." PPL Electric Statement No. 2. Dr. Israel also evaluated scientific research on RF fields and adverse health effects generally. He testified that he has been systematically examining this research over the past several decades and that many hundreds of studies have been published. PPL Electric Statement No. 2. He testified that three groups of controlled laboratory studies on animals "are particularly informative because they address fundamental biological functions that are very sensitive to any disruption: genetics, reproduction, and growth and development." PPL Electric Statement No. 2 at 8-9. Dr. Israel described a number of the studies in these areas which he considered good examples of well-designed and well-conducted studies. These studies found no adverse effects on genetics, fertility, reproduction, growth or development in the animals exposed to RF fields. PPL Electric Statement No. 2 at 9. Dr. Israel also provided examples of well-conducted animal studies on RF fields and cancer. He testified that these studies, which involved animals with lifetime exposures to RF fields, did not find any increased incidence in cancer in the RF exposed animals compared to non-exposed animals. PPL Electric Statement No. 2 at 9-10.

13

Based on the body of scientific research showing no consistent and reproducible effects from RF fields on cancer and other adverse health effects, the World Health Organization ("WHO") has concluded that "no adverse health effects have been established as being caused by mobile phone use." PPL Electric Statement No. 2 at 9-11. A number of other public health authorities, including agencies in Canada, the U.K., Sweden, Norway, the Netherlands, and New Zealand, among others, have recently reached similar conclusions. PPL Electric Statement No. 2 at 10-11; PPL Electric Exhibit MI-1. In addition, several U.S. state public health authorities and Public Utility Commissions have investigated claims about health effects from smart meters. These include the Maine Center for Disease Control (2010), the Vermont Department of Health (2012), Arizona Department of Health, Office of Environmental Health (2014), and North Carolina Department of Health and Human Services, Division of Public Health, Occupational

and Environmental Epidemiology Branch (2015). These evaluations by State public health authorities and Public Utility Commissions conclude that RF fields from smart meters do not pose any public health risk. PPL Electric Statement No. 2; PPL Electric Exhibit MI-2.

There is no reliable medical basis to conclude that RF fields from the AMI meter being used by PPL Electric will cause or contribute to the development of illness or disease. PPL Electric Statement No. 2 at 16. There is no reliable medical basis to conclude that RF fields from the AMI meter being used by PPL Electric would cause, contribute to, or exacerbate any of the symptoms claimed by the Complainants, or any other adverse health effects. PPL Electric Statement No. 2 at 16.

14
Additionally, on this issue, I find credible the expert testimony of PPL witness Dr. Christopher Davis who opined the Landis + Gyr AMI meter would not cause adverse health effects. Dr. Davis co-authored 255 articles published in peer-reviewed scientific journals, two books, twelve book chapters and 324 papers presented at scientific conferences. PPL Electric Statement No. 1 at 2. He conducted a substantial amount of research on RF fields of the type produced by the AMI meters being used by PPL. PPL Electric Statement No. 1 at 3. RF fields are part of the lower energy, non-ionizing portion of the electromagnetic spectrum which consists of lower frequency signals that do not have enough energy to break chemical bonds in cells or DNA. PPL Electric Statement No. 1 at 5-6. RF fields come from many sources in our everyday environments, including AM/FM radio, television broadcast, cell phones and their communication networks, portable phones, garage door openers and Wi-Fi networks. PPL Electric Statement No. 1 at 5-6, 14.

15
The FCC has determined safe public exposure levels for RF fields from devices that transmit RF signals, such as the AMI meters. PPL Electric Statement No. 1 at 9-10. The FCC safe public exposure limits are based on evaluations of the body of scientific research on RF fields and were adopted in consultation with other federal agencies, including the FDA and the EPA. PPL Electric Statement No. 1 at 9-12.

The levels of RF fields from the Landis + Gyr Focus AXR-SD AMI meters are 98,000 times lower than the RF exposure safety limits established by the FCC. PPL Electric

Statement No. 1 at 13, PPL Electric Exhibit CD2. RF signals from the AMI meter are of very short duration and will occur for only a total of 84 seconds over a 24-hour period. PPL Electric Statement No. 1 at 7.

There are six television broadcast towers within a 50-mile radius of Complainants' residence in Camp Hill, Pennsylvania. PPL Electric Statement No. 1 at 15.

16 Based on the locations of each tower and their RF power outputs, the constant background level of RF fields at Complainants' residence are 111 times higher than the RF signals from the AMI meter. PPL Electric Statement No. 1 at 15, PPL Electric Exhibit CD-5. The RF exposure from a cell phone used at a person's head is 260,000 times higher than the average RF levels one meter away from the Company's new smart meter. PPL Electric Statement No. 1 at 14. For all of these reasons, I find in favor of PPL on this issue.

Opt-In versus Opt-Out Program

During the hearing, Complainant requested either an opt out pursuant to Act 129, or a minimum 2-month delay until House Bill No. 313 is made into effective law. N.T. 62, Complainant Exhibit B.

17 Conversely, PPL contends its installation of an AMI Meter is required by Pennsylvania law and that it would not constitute unreasonable or unsafe service to install an AMI Meter on Complainants' property. N.T. 60.

Disposition

The Commission has ruled that there is no provision in the Code, the Commission's Regulations or Orders that allows a PECO customer to "opt-out" of smart meter installation. 66 Pa.C.S. § 2807(f); See *Bervinchak v. PPL Electric Utilities Corporation*, C-2016-2572824 and C-2016-2577527 (Final Order October 2, 2018, Initial Decision dated August 16, 2018); *Povacz v. PECO Energy Company*, Docket No. C-2012-2317176 at 10 (Order and Opinion entered January 24, 2013); *Povacz v. PECO Energy Company*, Docket No. C-2015-2475023 (ALJ Heep Initial Decision dated January 26, 2018). Moreover, the Commonwealth

Court has held that federal law does not preempt the Commission's interpretation. See *Romeo v. Pa. Pub. Util. Comm'n*, 154 A.3d 422 (Pa. Cmwlth. 2017). The Commonwealth Court did not expressly address whether Mr. Romeo could opt-out of a smart meter installation. The Court held that Mr. Romeo's claim that smart meters cause safety and fire hazards and have a negative health impact, is not legally insufficient pursuant to 66 Pa. C.S. § 1501, which requires utilities to maintain adequate, efficient, safe and reasonable service and facilities for their customers. *Id.*

I infer from the *Romeo* decision, that it is legally sufficient to plead the relief requested in the instant case and claim that smart meters are generally unsafe and unhealthy, and the installation of them is unreasonable service in violation of 66 Pa. C.S. § 1501. However, the Commonwealth Court did not expressly address the opt-in versus opt-out argument. Although Complainants similarly situated to Mr. Romeo are entitled to an evidentiary hearing, there is Commission precedent that there is no opt-out provision in the current law in Pennsylvania.

18
The Commission has consistently held there is no opt-out provision for similarly situated Complainants in the past. The instant case is more similar than distinguishable from prior decisions wherein the Commission has dismissed similar complaints. *Pennsylvania Trout v. Dep't of Env'tl. Prot.*, 863 A.2d 93 (Pa. Cmwlth. 2004).

On October 15, 2008, Governor Edward G. Rendell signed Act 129 of 2008 into law, which directed EDCs with at least 100,000 customers to file, with the Commission, a smart meter deployment and installation plan. Thus, there is a statute requiring smart meter deployment by large EDCs operating within the Commonwealth. 66 Pa. C.S. § 2807(f).

The implementation of the Respondent's Smart Meter Deployment Plan and the approval of the costs associated with its implementation have been found by the Commission to be in accordance with Act 129 of 2008, 66 Pa. C.S. § 2807(f). The Respondent is required by statute and Commission Order to implement a Smart Meter Program, to install smart meters throughout its service territory, and to charge a Smart Meter Technology Surcharge to all of its metered customers.

As the Commission stated in its April 21, 2016 Opinion and Order in the case of *Frompovich*:

In past cases involving smart meter installation, we have evaluated on an individual case-by-case basis the specific allegations presented in each complaint and reached a conclusion based on those particular circumstances. While PECO is correct that as adopted Act 129 does not provide a general opt out provision, where a complainant's objection to installation of a smart meter was not based upon a general objection to smart meters *per se*, but rather upon facts specific to the individual complainant, we have denied preliminary relief and allowed the complaint to proceed to hearing. See *Kreider v. PECO Energy Company*, Docket No. P-2015-2495064 (Order on Material Question entered September 3, 2015; Order on Reconsideration entered January 28, 2016) (*Kreider*); *Paul v. PECO Energy Company*, Docket No. C-2015-2475355 (Order entered March 17, 2016). As we stated previously, "the law does not prohibit us from considering or holding a hearing on issues related to the safety of smart meters, consistent with our statutory authority in Section 1501 of the Code, when a legally sufficient claim is presented." *Kreider*, Order on Material Question at 17.

As in *Kreider* and *Paul*, Ms. Frompovich has alleged factual averments specific to her that, *if proven*, could implicate, under her particular circumstances, a violation of Section 1501 of the Code, a statute the Commission has jurisdiction to administer.

Frompovich, supra at 11-12 (Opinion and Order entered April 21, 2016) (emphasis added).

To the extent that Complainant in the instant case desires the ability to opt-out of the smart meter installation, she could advocate for such ability before the General Assembly, which is currently considering amending Section 2807(f) in some pending bills including: PA House Bill Nos. 313, 1564 and 1565; and Senate Bill No. 443. Complainant Exhibit B. These bills are not yet law. The Commission has held that it does not have the authority, absent a directive in the form of legislation, to prohibit the Respondent from installing a smart meter where a customer does not want one. See *Povacz v. PECO Energy Company*, Docket No. C-2012-231716 (Opinion and Order entered January 24, 2013). The Commission held that similarly situated Respondents would be in violation of law if they did not install a smart meter at properties similarly situated to Complainants' residence. *Id., Frompovich* at 10. Thus, I find in favor of PPL on this issue.

CONCLUSION

For all of these aforementioned reasons, the Complaint will be dismissed for failure to prove by a preponderance of evidence that the installation of this smart meter constitutes unsafe

or unreasonable service under 66 Pa. C.S. § 1501 or otherwise violates the Public Utility Code, a Commission order or regulation or a Commission-approved tariff of the company. Although the Complainant is genuine in her concerns, the Commission's decisions cited above are controlling.

CONCLUSIONS OF LAW

1. The Commission has jurisdiction over the parties and the subject matter in this proceeding. 66 Pa. C.S. § 701.

2. PPL Electric Utilities Corporation's smart meter procurement and installation plan, which was approved by Commission Order in the case of *Petition of PPL Electric Utilities Corp. for Approval of Its Smart Meter Technology Procurement and Installation Plan*, Docket No. M-2014-2430781, p. 24 (Order Entered Sept. 3, 2015) does not contain a provision for customers to opt out of smart meter installation.

3. Under Section 332(a) of the Pennsylvania Public Utility Code, the proponent of a rule or order has the burden of proof. 66 Pa. C.S. § 332(a). It is well established that "[a] litigant's burden of proof before administrative tribunals as well as before most civil proceedings is satisfied by establishing a preponderance of evidence which is substantial and legally credible." *Samuel J. Lansberry, Inc. v. Pa. Pub. Util. Comm'n*, 578 A.2d 600, 602 (Pa. Cmwlth. 1990).

4. The preponderance of evidence standard requires proof by a greater weight of the evidence. *Commonwealth v. Williams*, 557 Pa. 207, 732 A.2d 1167 (1999). This standard is satisfied by presenting evidence that makes the existence of a contested fact more likely than its nonexistence. *Brown v. Commonwealth*, 940 A.2d 610, 614 n.14 (Pa. Cmwlth. 2008) (citation omitted).

5. A person does not sustain his or her burden of proof in an electric and magnetic field exposure case when the record evidence, "taken as a whole, leads to the ultimate finding and conclusion that the scientific studies at present are inconclusive" rather, the person must demonstrate by a preponderance of the evidence that such exposure actually causes adverse

health effects. *Letter of Notification of Phila. Elec. Co. Relative to the Reconstructing and Rebuilding of the Existing 138 kV Line to Operate as the Woodbourne-Heaton 230 kV Line in Montgomery and Bucks Counties*, 1992 Pa. PUC Lexis 160, at *210-11 (June 29, 1992) (Initial Decision).

6. In AMI meter-related matters, the Commission has held that “[t]he Complainant will have the burden of proof during the proceeding to demonstrate, by a preponderance of the evidence, that [the utility] is responsible or accountable for the problem described in the Complaint.” *Kreider v. PECO Energy Co.*, Docket No. P-2015-2495064, p. 18 (Order entered Sept. 3, 2015).

7. Section 701 of the Public Utility Code provides that “any person . . . having an interest in the subject matter . . . may complain in writing, setting forth any act or thing done or omitted to be done by any public utility in violation, or claimed violation, of any law which the commission has jurisdiction to administer, or of any regulation or order of the commission.” 66 Pa. C.S. § 701.

8. The Commission has exclusive jurisdiction to adjudicate “issues involving the reasonableness, adequacy, and sufficiency” of a public utility’s facilities and services. See *Elkin v. Bell of Pa.*, 420 A.2d 371, 374 (Pa. 1980) (citations omitted).

9. When presented with a challenge to an AMI meter installation, the Commission has pronounced that “[t]he ALJ’s role . . . will be to determine based on the record in this particular case, whether there is sufficient evidence to support a finding that the Complainant was adversely affected by the smart meter or whether [the utility’s] use of a smart meter will constitute unsafe or unreasonable service in violation of Section 1501 under the circumstances in this case.” *Kreider v. PECO Energy Co.*, Docket No. P-2015-2495064, p. 23 (Order entered Jan. 28, 2016) (citing *Woodbourne-Heaton*, 1992 Pa. PUC Lexis 160, at *12-13).

10. Complainant has failed to sustain the burden of proof that installing the new AMI meter would violate the Public Utility Code or any Commission regulation or order. See 66 Pa. C.S. §§ 332(a), 701.

11. PPL is legally required to install the RF Mesh meter on the Complainants' property by Act 129 and Commission orders. See 66 Pa. C.S. § 2807(f); *Smart Meter Procurement and Installation*, Docket No. M-2009-2092655, pp. 9, 14 (Order entered June 24, 2009).

12. Nothing in Act 129 permits a customer to "opt-out" of a smart meter installation. See, e.g., *Starr v. PECO Energy Co.*, Docket No. C-2015-2516061, p. 11 (Order Entered Sept. 1, 2016).

13. The Commission previously determined that the Company's existing PLC meters are not compliant with Act 129 and the Commission's Smart Meter Implementation Order. See *Petition of PPL Electric Utilities Corporation for Approval of Smart Meter Technology Procurement and Installation Plan*, Docket No. M-2009-2123945, p. 24 (Order entered June 24, 2010).

14. Under the Company's Commission-approved Smart Meter Plan, PPL must replace all of the PLC meters with the RF Mesh meters, which the Commission declared as meeting all of the requirements of Act 129 and the Commission's Smart Meter Implementation Order. See *Petition of PPL Electric Utilities Corp. for Approval of Its Smart Meter Technology Procurement and Installation Plan*, Docket No. M-2014-2430781, p. 24 (Order Entered Sept. 3, 2015).

15. Complainant has failed to demonstrate that the new AMI meter causes, contributes to, or exacerbates any adverse health effect.

16. Complainant has failed to sustain her burden of proof that installing the new AMI meter would constitute unsafe or unreasonable service in violation of 66 Pa. C.S. §1501.

19

ORDER

THEREFORE,

IT IS ORDERED:

1. That the Formal Complaint filed by Sharon Landis against PPL Electric Utilities Corporation at Docket No. C-2018-3002142 is denied and dismissed.
2. That the docket in this proceeding be marked closed.

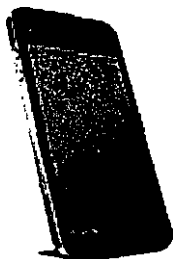
Date: December 19, 2019

/s/
Elizabeth H. Barnes
Administrative Law Judge



Cell Phone Radio Frequency Radiation

Final reports from the rat and mouse studies, plus the press release and fact sheet, are now available.



Research Overview

Status: Completed

Substances: Cell Phone Radiation: GSM, Cell Phone Radiation: CDMA

Nominated: May 1999

BACKGROUND INFORMATION

Cell phones are currently used by 95% of American adults. The U.S. Food and Drug Administration (FDA) nominated radio frequency radiation (RFR) used by cell phones for an NTP study because of widespread public use of cell phones and limited knowledge about potential health effects from long-term exposure.

NTP STUDIES & FINDINGS

NTP conducted toxicology studies in rats and mice to help clarify potential health hazards, including cancer risk, from exposure to RFR like that used in 2G and 3G cell phones which operate within a range of frequencies from about 700 – 2700 megahertz (MHz).

RECEIVED

JAN 10 2020

What did the studies find?

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

The NTP studies found that high exposure to RFR (900 MHz) used by cell phones was associated with:

- **Clear evidence of tumors in the hearts of male rats.** The tumors were malignant schwannomas.
- **Some evidence of tumors in the brains of male rats.** The tumors were malignant gliomas.
- **Some evidence of tumors in the adrenal glands of male rats.** The tumors were benign, malignant, or complex combined pheochromocytoma.

It was unclear if tumors observed in the studies were associated with exposure to RFR in female rats (900 MHz) and male and female mice (1900MHz). This is also known as equivocal evidence.

The final conclusions represent the consensus between NTP and a panel of external scientific experts who thoroughly reviewed the draft NTP technical reports at a public meeting in March 2018.

The results are based on NTP's four categories of evidence that a substance may cause cancer: clear evidence (highest), some evidence, equivocal evidence, no evidence (lowest).

What are NTP's future plans for studying cell phone RFR and 5G wireless technology?

5G is currently emerging and will eventually overtake the existing 2G, 3G, and 4G technology. In the meantime, consumers will continue to be exposed to RFR from these sources in the 700-2700 MHz range. As the 5G network is implemented, some of the signals will use the same lower frequencies as the older technology previously studied by NTP. Additionally, concern has been raised because the 5G network will also use higher frequencies, up to 60,000 MHz, thereby exposing wireless consumers to a much broader spectrum of frequencies. The higher frequencies, known as millimeter waves, can rapidly transmit enormous amounts of data with increased network capacity compared to current technologies. Millimeter waves do not travel as far and do not penetrate the body as deep as the wavelengths from the lower frequencies. Millimeter waves are likely to penetrate no deeper than the skin, as opposed to the lower frequencies that have been shown to penetrate at least three to four inches into the human body.

NTP is currently evaluating the existing literature on the higher frequencies intended for use in the 5G network and is working to better understand the biological basis for the cancer findings reported in earlier studies on RFR with 2G and 3G technologies. Additionally, work is ongoing to develop smaller RFR exposure chambers for additional short-term studies that will take weeks and months rather than years. The exposure system is also being designed with the capability of conducting studies with various RFR frequencies and modulations to keep up with the changing technologies in the telecommunications industry.

NTP is also hoping to identify biomarkers of damage from RFR exposure. These would be measurable physical changes that can be seen in shorter periods of time than it takes to develop cancer. Examples could be changes in behavior after exposure or molecular changes that might be predictive of cancer. If scientists can better understand biological changes in animals, they will know more about what to look for in humans.

INFORMATIONAL RESOURCES

- ▶ [Fact Sheet and FAQ](#)
- ▶ [Media Briefing and Interviews](#)
- ▶ [Newsletters](#)
- ▶ [Presentations](#)
- ▶ [Publications](#)
- ▶ [Photos of the Radiofrequency Radiation Research Facility](#)

STAY INFORMED & CONTACT US

Stay Informed

Subscribe to [receive email](#) to stay informed about cell phone radio frequency radiation research and other NTP information.

Contact Us

For questions or additional information, [email us](#) or use our [contact form](#).



Web page last updated on Aug. 15, 2019

NTP is located at the [National Institute of Environmental Health Sciences](#), part of the [National Institutes of Health](#)

The study also indicated changes in male rat's prostate gland, liver, pancreas cells. Both male & female rats had abnormal heart growth in the right side of the heart. There was genetic damage in both male & female rodents.



National Institute of Environmental Health Sciences
Your Environment. Your Health.

(<https://www.niehs.nih.gov>)



Use this QR code to view the newest version of this document

Cell Phone Radio Frequency Radiation

Introduction

Cell phones are currently used by 95% [\(http://www.pewinternet.org/fact-sheet/mobile/\)](http://www.pewinternet.org/fact-sheet/mobile/) of American adults. NIEHS and other scientific organizations are actively studying the potential health effects of radio frequency radiation used in cell phones.

What is NIEHS Doing?

The National Toxicology Program (NTP) [\(https://ntp.niehs.nih.gov/\)](https://ntp.niehs.nih.gov/), headquartered at NIEHS, has conducted toxicology studies in rats and mice to help clarify potential health hazards, including cancer risk, from exposure to radio frequency radiation like that used in 2G and 3G cell phones.

What did the studies find?

The NTP studies [\(https://ntp.niehs.nih.gov/results/areas/cellphones/\)](https://ntp.niehs.nih.gov/results/areas/cellphones/) found that high exposure to RFR used by cell phones resulted in:

- **Clear evidence of tumors in the hearts of male rats.** The tumors were malignant schwannomas.
- **Some evidence of tumors in the brains of male rats.** The tumors were malignant gliomas.
- **Some evidence of tumors in the adrenal glands of male rats.** The tumors were benign, malignant, or complex combined pheochromocytoma.

For female rats, and male and female mice, it was unclear if tumors observed in the studies were associated with RFR used by cell phones. This is also known as equivocal evidence.

The final conclusions represent the consensus between NTP and a panel of external scientific experts who thoroughly reviewed the NTP draft technical reports at a public meeting in March 2018.

The results are based on NTP's four categories of evidence that a substance may cause cancer: clear evidence (highest), some evidence, equivocal evidence, no evidence (lowest).

Further Reading

Stories from the *Environmental Factor* (NIEHS Newsletter)

- High exposure to radio frequency radiation associated with cancer in male rats [\(https://factor.niehs.nih.gov/2018/11/feature/1-feature-radiation/index.htm\)](https://factor.niehs.nih.gov/2018/11/feature/1-feature-radiation/index.htm) (November 2018)
- NTP Cell Phone Studies — Experts Recommend Elevated Conclusions [\(https://factor.niehs.nih.gov/2018/4/feature/feature-2-cell-phone/index.htm\)](https://factor.niehs.nih.gov/2018/4/feature/feature-2-cell-phone/index.htm) (April 2018)

- [NTP Releases Rodent Studies on Cell Phone Radiofrequency Radiation](https://factor.niehs.nih.gov/2016/6/science-highlights/cellphones/index.htm) [↗](#)
(<https://factor.niehs.nih.gov/2016/6/science-highlights/cellphones/index.htm>) (June 2016)

Press Releases

- [High Exposure to Radiofrequency Radiation Linked to Tumor Activity in Male Rats](#) (Feb. 2, 2018)

Additional Resources

- [Cell Phones and Cancer Risk Fact Sheet](https://www.cancer.gov/cancertopics/factsheet/Risk/cellphones) [↗](#) (<https://www.cancer.gov/cancertopics/factsheet/Risk/cellphones>) - National Cancer Institute (NCI)
- [Consumer Update on Cell Phones](https://www.fda.gov/radiation-emittingproducts/radiationemittingproductsandprocedures/homebusinessandentertainment/cellphones/default.htm) [↗](#)
(<https://www.fda.gov/radiation-emittingproducts/radiationemittingproductsandprocedures/homebusinessandentertainment/cellphones/default.htm>) - U.S. Food and Drug Administration (FDA)
- [Fact Sheet on Mobile Phones](http://www.who.int/mediacentre/factsheets/fs193/en/index.html) [↗](#) (<http://www.who.int/mediacentre/factsheets/fs193/en/index.html>) - World Health Organization (WHO)
- [IARC Classifies Radiofrequency Electromagnetic Fields as Possibly Carcinogenic to Humans](http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf) [↗](#)
(http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf) - The WHO/International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer, associated with wireless phone use.
- [Tips for reducing exposure to radiofrequency radiation](https://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/ucm116293.htm) [↗](#)
(<https://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/ucm116293.htm>)

Related Health Topics



- [Electric & Magnetic Fields](#)
- [Toxicology](#)

Research Links

- Michael Wyde, Mark Cesta, Chad Blystone, Susan Elmore, Paul Foster, Michelle Hooth, Grace Kissling, David Malarkey, Robert Sills, Matthew Stout, Nigel Walker, Kristine Witt, Mary Wolfe, John Bucher. 2016. Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposure) bioRxiv 055699. [[Abstract Michael Wyde, Mark Cesta, Chad Blystone, Susan Elmore, Paul Foster, Michelle Hooth, Grace Kissling, David Malarkey, Robert Sills, Matthew Stout, Nigel Walker, Kristine Witt, Mary Wolfe, John Bucher, 2016. Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats \(Whole Body Exposure\) bioRxiv 055699.](#) [↗](#)
(<http://biorxiv.org/content/early/2016/06/23/055699>) [doi:10.1101/055699] Michael Wyde, Mark Cesta, Chad Blystone, Susan Elmore, Paul Foster, Michelle Hooth, Grace Kissling, David Malarkey, Robert Sills, Matthew Stout, Nigel Walker, Kristine Witt, Mary Wolfe, John Bucher, 2016. Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposure) bioRxiv 055699. [↗](#) (<https://doi.org/10.1101/055699>)] [PDF Michael Wyde, Mark Cesta, Chad Blystone, Susan Elmore, Paul Foster, Michelle Hooth, Grace Kissling, David Malarkey, Robert Sills, Matthew Stout,

[Nigel Walker, Kristine Witt, Mary Wolfe, John Bucher, 2016. Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats \(Whole Body Exposure\) bioRxiv 055699. !\[\]\(61f857d186383e36e862eb041761959b_img.jpg\)](#)
[\[http://biorxiv.org/content/early/2016/06/23/055699.full.pdf\]](http://biorxiv.org/content/early/2016/06/23/055699.full.pdf)

File Assistance: Downloads for viewing files

Adobe Reader   [\(https://get.adobe.com/reader/\)](https://get.adobe.com/reader/)



Cell Phone Radio Frequency Radiation Studies

Cell phones are used by 95% of American adults.¹ Given the large number of users, any harmful effects associated with cell phone use could be a significant public health concern.

Cell phones use radio frequency radiation (RFR) to transmit signals. The U.S. Food and Drug Administration (FDA) nominated RFR for study by the National Toxicology Program (NTP), due to widespread human exposure and limited information about the potential health effects of long-term use of cell phones.

What did NTP study?

NTP conducted toxicology studies in rats and mice to help clarify potential health hazards, including cancer risk, from exposure to RFR used in 2G and 3G cell phones. 2G and 3G networks were standard when the studies were designed and are still used for phone calls and texting.

The \$30 million NTP studies took more than 10 years to complete and are the most comprehensive assessment, to date, of health effects in animals exposed to RFR. The results will help guide other studies of newer technologies.



If you are concerned about potential health risks from RFR, the FDA suggests the following tips:²

- *Use speaker mode or a headset to place more distance between your head and the cell phone.*
- *Reduce the amount of time spent using your cell phone.*



What did the studies find?

NTP studies found that exposure to high levels of RFR, like that used in 2G and 3G cell phones, was associated with:

- **Clear evidence of tumors in the hearts of male rats.** The tumors were malignant schwannomas.
- **Some evidence of tumors in the brains of male rats.** The tumors were malignant gliomas.
- **Some evidence of tumors in the adrenal glands of male rats.** The tumors were pheochromocytomas.

For female rats, and male and female mice, it was unclear, also known as equivocal, whether cancers observed in the studies were associated with exposure to RFR.

The conclusions were based on the NTP four categories of evidence that a substance may cause cancer.

- Clear evidence (highest)
- Some evidence
- Equivocal evidence
- No evidence (lowest)





Do the rat and mouse findings apply to humans?

The findings in animals cannot be directly applied to humans for two key reasons:

- The exposure levels and durations were greater than what people may receive from cell phones.
- The rats and mice received RFR across their whole bodies, which is different from the more localized exposures humans may receive, like from a cell phone in their pocket or next to their head.

However, the studies question the long-held assumption that radio frequency radiation is of no concern as long as the energy level is low and does not significantly heat the tissues.

Still, the effects observed in the animals were relatively rare. NTP scientists are not sure why male rats appear to be at greater risk for developing tumors compared to female rats.

How do the RFR levels used in the studies compare to typical human exposures?

The lowest exposure level used in the studies was equal to the maximum local tissue exposure currently allowed for cell phone users. This power level rarely occurs with typical cell phone use. The highest exposure level in the studies was four times higher than the maximum power level permitted for local tissues.



Did NTP find health effects other than cancer?

NTP found lower body weights among newborn rats and their mothers, especially when exposed to high levels of RFR during pregnancy and lactation, yet these animals grew to normal size.

What factors contributed to the NTP conclusions?

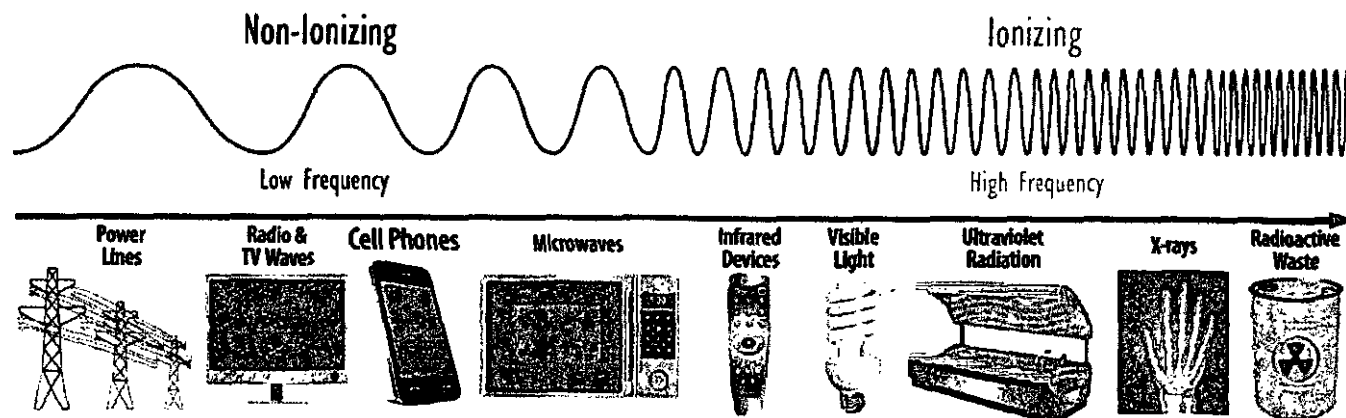
In addition to seeing tumors in the male rats with higher exposures to RFR, NTP scientists also observed other changes in the hearts of exposed male and female rats that supported their conclusions.

The evidence for tumors in the brain and adrenal glands was not as strong as what NTP scientists saw in the heart. However, the type of brain cancer observed is similar to a type of brain tumor linked to heavy cell phone use in some human studies.³

Why did NTP expose the animals' whole bodies to RFR?

Although many previous studies focused on exposure to the brain, NTP scientists wanted to make sure that they were considering health effects to the whole body, especially since many people do not hold their phones next to their head much of time.

Electromagnetic Spectrum



RFR used in cell phones is at the lower frequency and lower energy end of the electromagnetic spectrum.



What is the difference between electric and magnetic fields and RFR?

RFR is a subcategory of electric and magnetic fields (EMF), which are the invisible waves of force that surround any electrical device. The different types of EMF are distinguished by their frequencies. RFR is a form of low frequency, non-ionizing radiation that was thought to be relatively harmless.

How were the studies conducted?

Rats and mice were exposed to RFR in special chambers for up to two years, or most of their natural lives. NTP scientists looked for a range of cancers and noncancer health effects.

Exposure to RFR began in the womb for rats and at 5-6 weeks old for mice. The RFR exposure was intermittent, 10 minutes on and 10 minutes off, totaling about 9 hours each day. The RFR levels ranged from 1.5 to 6 watts per kilogram of body weight in rats, and 2.5 to 10 watts per kilogram in mice.

The chambers were shielded rooms with a transmitting antenna that radiated RFR fields, plus rotating stirrers that generated a uniform field.^{4,5} Pilot studies established field strengths that did not raise animal body temperatures excessively.⁶

The rats and mice were exposed to whole body RFR at frequencies of 900 and 1900 megahertz, respectively, from two technologies – Code Division Multiple Access (CDMA) and Global System for Mobile Communications (GSM).

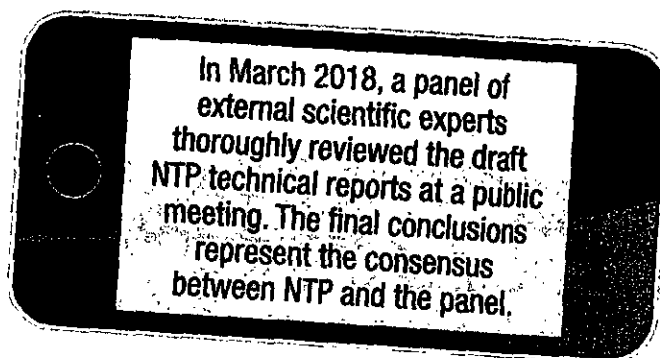
NTP and RFR experts from the National Institute of Standards and Technology (NIST) and the IIT Foundation designed and built the chambers specifically for these studies.



Chambers at the IIT Research Institute in Chicago where the studies took place

What is the difference between CDMA and GSM?

CDMA and GSM are two common ways of transmitting cell phone signals in the U.S. and Europe. There are substantial differences in signal structure that may result in different RFR exposures, so NTP wanted to expose the animals to both modulations.



How do the NTP studies relate to 4G, 5G, or Wi-Fi?

NTP studies of RFR used in 2G and 3G cell phones do not apply to 4G or 5G technologies. These newer technologies use different methods of signal modulation than NTP used in the studies. The NTP studies also did not investigate frequencies and modulations used for Wi-Fi.

What were the studies' strengths?

NTP was able to control exactly how much RFR the animals received — something that is not possible when studying human cell phone use.

Were there any surprise findings?

NTP found longer lifespans among the exposed male rats. This may be explained by an observed decrease in chronic kidney problems that are often the cause of death in older rats.

What will NTP do with the results of the studies?

NTP will provide these studies to the FDA and Federal Communications Commission. The agencies will review the information as they continue to monitor new research on the potential health effects of RFR.

Final reports and data tables are available on the NTP website at <https://ntp.niehs.nih.gov/go/cellphone>.



National Institute of Environmental Health Sciences
Your Environment. Your Health.

<https://www.niehs.nih.gov>



Use this QR code to view the newest version of this document

High Exposure to Radio Frequency Radiation Associated With Cancer in Male Rats

News Release

Archive - New Contact Information

For more information about this archival news release, please contact [Sheena Scruggs, Ph.D.](#), Office of Communications & Public Liaison, NIEHS at (984) 287-3355.

FOR IMMEDIATE RELEASE

Thursday, November 1, 2018, 10:00 a.m. EDT

Contact: [Virginia Guidry](#), NIEHS
919-541-1993

National Toxicology Program releases final reports on rat and mouse studies of radio frequency radiation like that used in 2G and 3G cell phone technologies

The National Toxicology Program (NTP) concluded there is clear evidence that male rats exposed to high levels of radio frequency radiation (RFR) like that used in 2G and 3G cell phones developed cancerous heart tumors, according to [final reports](#) <https://ntp.niehs.nih.gov/results/areas/cellphones/> released today. There was also some evidence of tumors in the brain and adrenal gland of exposed male rats. For female rats, and male and female mice, the evidence was equivocal as to whether cancers observed were associated with exposure to RFR. The final reports represent the consensus of NTP and a panel of external scientific experts who reviewed the studies in March after [draft reports were issued in February](#) [https://www.nih.gov/news-events/news-releases/high-exposure-radiofrequency-radiation-linked-tumor-activity-male-rats](#).

Audio Recording of Telephone Press Conference
October 31, 2018

Transcript

[https://www.niehs.nih.gov/newsroom/releases/2018/november/11/012018transcript_508.pdf](#)
(151KB)

- [NTP Cell Phone Study Page](#) <https://ntp.niehs.nih.gov/results/areas/cellphones/index.html>
- [Fact Sheet](#) [https://www.niehs.nih.gov/health/materials/cell_phone_radiofrequency_radiation_studies_508.pdf](#) (1MB)
- [Final Rat Study Report](#) [https://www.niehs.nih.gov/ntp-temp/tr525_508.pdf](https://www.niehs.nih.gov/ntp/temp/tr525_508.pdf)
- [Final Mouse Study Report](#) https://www.niehs.nih.gov/ntp-temp/tr596_508.pdf

<https://www.nih.gov/news-events/news-releases/high-exposure-radiofrequency-radiation-linked-tumor-activity-male-rats>.

"The exposures used in the studies cannot be compared directly to the exposure that humans experience when using a cell phone," said John Bucher, Ph.D., NTP senior scientist. "In our studies, rats and mice received radio frequency radiation across their whole bodies. By contrast, people are mostly exposed in specific local tissues close to where they hold the phone. In addition, the exposure levels and durations in our studies were greater than what people experience."

The lowest exposure level used in the studies was equal to the maximum local tissue exposure currently allowed for cell phone users. This power level rarely occurs with typical cell phone use. The highest exposure level in the studies was four times higher than the maximum power level permitted.

"We believe that the link between radio frequency radiation and tumors in male rats is real, and the external experts agreed," said Bucher.

The \$30 million NTP studies took more than 10 years to complete and are the most comprehensive assessment, to date, of health effects in animals exposed to RFR with modulations used in 2G and 3G cell phones. 2G and 3G networks were standard when the studies were designed and are still used for phone calls and texting.

"A major strength of our studies is that we were able to control exactly how much radio frequency radiation the animals received — something that's not possible when studying human cell phone use, which has often relied on questionnaires," said Michael Wyde, Ph.D., lead toxicologist on the studies.

He also noted the unexpected finding of longer lifespans among the exposed male rats. "This may be explained by an observed decrease in chronic kidney problems that are often the cause of death in older rats," Wyde said.

The animals were housed in chambers specifically designed and built for these studies. Exposure to RFR began in the womb for rats and at 5 to 6 weeks old for mice, and continued for up to two years, or most of their natural lifetime. The RFR exposure was intermittent, 10 minutes on and 10 minutes off, totaling about nine hours each day. RFR levels ranged from 1.5-6 watts per kilogram in rats, and 2.5-10 watts per kilogram in mice.

These studies did not investigate the types of RFR used for Wi-Fi or 5G networks.

"5G is an emerging technology that hasn't really been defined yet. From what we currently understand, it likely differs dramatically from what we studied," said Wyde.

For future studies, NTP is building smaller RFR exposure chambers that will make it easier to evaluate newer telecommunications technologies in weeks or months, rather than years. These studies will focus on developing measurable physical indicators, or biomarkers, of potential effects from RFR. These may include changes in metrics like DNA damage in exposed tissues, which can be detected much sooner than cancer.

The U.S. Food and Drug Administration nominated cell phone RFR for study by NTP because of widespread public use of cell phones and limited knowledge about potential health effects from long-term exposure. NTP will provide the results of these studies to FDA and the Federal Communications Commission, who will review the information as they continue to monitor new research on the potential effects of RFR.

NTP uses four categories [of \(https://ntp.niehs.nih.gov/results/pubs/longterm/defs/index.html\)](https://ntp.niehs.nih.gov/results/pubs/longterm/defs/index.html) to summarize the evidence that a substance may cause cancer:

- Clear evidence (highest)
- Some evidence
- Equivocal evidence
- No evidence (lowest)

About the National Toxicology Program (NTP): NTP is a federal, interagency program headquartered at NIEHS, whose goal is to safeguard the public by identifying substances in the environment that may affect human health. For more information about NTP and its programs, visit ntp.niehs.nih.gov or <https://www.niehs.nih.gov>.

About the National Institute of Environmental Health Sciences (NIEHS): NIEHS supports research to understand the effects of the environment on human health and is part of NIH. For more information on environmental health topics, visit www.niehs.nih.gov. Subscribe to one or more of the NIEHS news lists (www.niehs.nih.gov/news/newsroom/newslist/index.cfm) to stay current on NIEHS news, press releases, grant opportunities, training, events, and publications.

About the National Institutes of Health (NIH): NIH, the nation's medical research agency, includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services. NIH is the primary federal agency conducting and supporting basic, clinical, and translational medical research, and is investigating the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov or <https://www.nih.gov>.


Previous Release

Genetics and Pollution Drive Severity of Asthma Symptoms

Next Release

Soy Formula Feeding During Infancy Associated With Severe Menstrual Pain in Adulthood

File Assistance: Downloads for viewing files

Adobe Reader  <https://get.adobe.com/reader/>

Jan 9, 2020

Secretary
PA Public Utility Commission
400 North St.
Commonwealth Keystone Bldg, 2nd FL
Harrisburg, PA 17120

RE: ^{Sharon} Landis vs PPL C-2018-3002/42

On May 23, 2018 at approximately 12:45, 3 PPL employees showed up at my door. They said PPL was taking a "hard line" on this issue and my power would be shut off tomorrow if the meter was not replaced. PPL was aware of why I did not want the meter replaced. Notices had also been hung on my door knob. Being a person with asthma & allergies, the idea of not having my air conditioner to help me breath safely + well would cause me problems. (See L-1 & L-2)
I also experience symptoms with

Sharon Landis

existing meter & did not want the possibility of increased symptoms due to the newer, stronger meter.

The stress of this encounter caused a dangerous increase in blood pressure.

Because of previous threatened shut offs I had filed a complaint with PUC earlier on that same day, May 23, 2018

On August 16²⁰¹⁹ Devin Ryan left a note (message) on my answering machine indicating they were reaching out with an idea to relocate the meter on the property. They would contact me about sending an engineer to look the property over.

Sharon Landis

Because I mistakenly thought the cost of the engineer to give an relocation estimate was my responsibility, I initially did not want to do this.

Later when I understood there would be no charge for an engineer to come out and give an estimate of cost of relocation, I contacted ^{Mr.} Ryan to go ahead.

As of Jan 9, 2020 I have not been contacted in regard to relocation of meter or engineer coming here.

As a senior citizen living on an already-stressed fixed income, I feel the cost of relocation should be the responsibility of PPL, as replacing the meter in circumstances such as mine, provisions should have been made at the start.

Sharon Landis

Nevertheless, should the relocation end up my responsibility, the cost should be spread out over manageable monthly payments

I believe a hold should be placed on meter-change related shutoffs until the pending bills are considered by the General Assembly. This action could avoid much legal action, cost, waste of time, etc. It could even possibly save a life. In my case, who would have been responsible had I dropped dead from a stroke or heart attack caused by the spike in my blood pressure because of stress caused by incident on May 23, 2018? Dropped dead right there in my front yard on May 23, 2018?

Sharon Landis

Sadly some things are not made right until after a tragic event happens. This should not be.

I request the right thing be done - put a hold on meter-related shut offs immediately.

Although the shut off issue is very important, I would also like to address the many pages regarding the law & "proof" issues I do not totally agree with.

Respectfully,

Sharon Landis

Jan 9, 2020

1809 Letchworth Dr

Camp Hill, PA 17011

(717) 763-0785

As a person with multiple allergies (foods, scents, hypersensitivity to many* chemicals) (some with severe reactions which could put me in the ER. The threat of shut off was very stressful.

My home is my 'safe place' where I work very hard to maintain as much scent-free, allergen free, irritant space as possible. For instance, visitors remove shoes & put on shoe covers & in some instances, coveralls

My asthma is well controlled and this is very important, especially for one of my age - mid 70^s - and I want to keep it that way.

So one can understand the stress a shut-off would cause.

Because of the numerous allergies,

* I am on the PA Pesticide Hypersensitivity list for pesticides, herbicides.

going elsewhere was not an option.
(being in an area where a bug spray
was used could cause a very severe
reaction for instance.) and would have
possible dire consequences.

I felt my "safe place" was being
threatened.

L-2

I did not want the meter replaced because of existing problems near the existing meter.

I experienced trouble getting to sleep, staying asleep, (waking every 1 1/2 hr or so. I experienced agitation, anxiety, ear buzzing, and most alarming - heart racing. I had no electronic devices in my bedroom. Only electric items were a bedside lamp + wind-up clock. My symptoms went away when I left the house. The electric meter is on the bedroom outside wall.

I moved my bedroom to another room & symptoms disappeared.

When I am near the meter wall symptoms come back.

L-
One can figure out if symptoms disappear when one leaves the house. The symptoms are connected with the house. If one has symptoms in one area (room) and not in other areas of house, one can assume the symptoms are connected to that room.

My experience, observations show

1. Symptoms occur when I am in the room where meter is located on outside wall
2. Symptoms disappear when I leave that room or leave house
3. Symptoms disappeared when I moved my sleeping area from room w/ meter wall.

Sharon Landis
1809 Hetchworth Dr.
Camp Hill, PA 17011

Secretary
PA Public Utility Comm.
400 North St
Commonwealth Keystone Bldg 2 FL.
Harrisburg, PA 17120