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July 13, 2018

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

Re: Patti Lynn Caesar v. PECO Energy Company
Docket No. C-2017-2605462

Dear Secretary Chiavetta:

A copy of PECO's Main Brief is attached for filing.

Very truly yours,



Ward L. Smith
Counsel for PECO Energy Company

WS/adz
Enclosures

c: Honorable Darlene D. Heep, ALJ
Certificate of Service

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Patti Lynn Caesar :
 :
 v. : Docket No. C-2017-2605462
 :
 PECO Energy Company :

CERTIFICATE OF SERVICE

I, Ward L. Smith hereby certify that on July 13, 2018, I served a copy of PECO Energy Company's Main Brief, in the above matter, upon all interested parties via email and overnight delivery to:

Patti Lynn Caesar
212 Williamsburg Road
Ardmore, PA 19003
Passiflora225@gmail.com

Dated: July 13, 2018



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**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Patti Lynn Caesar

v.

PECO Energy Company

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C-2017-2605462

Main Brief of PECO Energy Company

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Introduction

This proceeding involves a claim by Ms. Caesar that installation by PECO Energy Company (“PECO”) of an Advanced Metering Infrastructure (“AMI”) meter at her home would cause her to suffer an adverse health effect because, she says, she has electrical hypersensitivity, or “EHS.” She is also concerned that the AMI meter would violate her privacy rights and would cause a fire at her residence.

After a full evidentiary hearing, Ms. Caesar did not prove any of her claims by a preponderance of the evidence. To the contrary, PECO provided substantial, persuasive evidence that its AMI meters will not cause or contribute to any adverse health effect or exacerbate any illness. Moreover, PECO has provided reasonable accommodations to address Ms. Caesar’s concerns about her health. PECO also has demonstrated that Ms. Caesar’s privacy concerns are not well-founded; and that AMI meter do not impose an unreasonable risk of fires. Therefore, Ms. Caesar’s Complaint should be dismissed.

Background and Procedural History

On May 22, 2017, the Commission served PECO with Ms. Caesar's formal Complaint, in which she stated that she is "refusing to have an AMI meter installed in [her] home because of health (electro-sensitivity) and safety reasons (fires). She also attached to the Complaint a letter claiming that AMI meters would illegally surveil her.

On June 1, 2017, PECO filed its Answer denying the material allegations of the Complaint and requesting, as a matter of course, that the matter be dismissed.

On June 16, 2017, a Hearing Notice was issued, setting the matter for hearing on Dec. 5 and 6, 2017.

On June 19, 2017, Ms. Caesar filed a document, styled as an "Answer to Motion to Dismiss," in which she briefly responded to PECO's Answer.

On June 20, 2017, a Prehearing Order was issued, setting interim dates of July 25, 2017 for the exchange of witness reports and November 17, 2017 for the exchange of hearing exhibits.

On July 24, PECO served its witness reports.

On July 24, 2017, Ms. Caesar filed a letter from her treating physician, Dr. Birgit Rakel.

On October 2, 2017, PECO served its Set I discovery.

On October 13, 2017, Ms. Caesar served objections to PECO's Set I discovery.

On November 17, 2017, PECO served its hearing exhibits.

On November 17, 2017, Ms. Caesar filed a request for a continuance with the Commission. On November 20, 2017, she filed the request with the Administrative Law Judge and served a copy on PECO.

On November 21, 2017, ALJ Heep granted the request for continuance, setting a new date of February 8, 2018 for the exchange of hearing exhibits.

On November 28, 2017, a Hearing Cancellation/Reschedule Notice was issued, setting a new hearing date of February 22, 2018.

On February 7, 2018, PECO served its hearing exhibits.

On February 8, 2018, Ms. Caesar served her hearing exhibits.

On February 12, 2018, PECO served an amended hearing exhibit.

On February 22, 2018, Ms. Caesar served an amended hearing exhibit.

On February 22, the evidentiary hearing took place as scheduled. Ms. Caesar appeared *pro se* and presented her own testimony and exhibits. PECO was represented by Ward Smith, Esq., Shawane Lee, Esq., and Tom Watson, Esq. and presented the testimony of Glenn Pritchard, Christopher Davis, Ph.D., and Mark Israel, M.D. The hearing resulted in a 176-page transcript and dozens of admitted exhibits.

On May 9, 2018, a Briefing Order was issued, setting the dates for Main Briefs on June 18, 2018 and Reply Briefs on July 18, 2018.

On June 15, 2018, Briefing Order #2 was issued, setting new dates for Main Briefs on July 2, 2018 and Reply Briefs on August 1, 2018.

At approximately midnight on June 1, 2018, Ms. Caesar sent an email to the Administrative Law Judge and PECO requesting an additional extension, for an unspecified period of time, to file Main Briefs. On June 2, 2018, the ALJ issued a new Briefing Order, setting new dates for Main Briefs on July 13, 2018 and Reply Briefs on August 8, 2018.

Proposed Findings of Fact
Testimony of Patti Lynn Caesar

1. Ms. Caesar resides at 212 Williamsburg Road, Ardmore, PA, 19003. Tr. 6.
2. Ms. Caesar is a psychologist and an herbalist. Tr. 12.
3. Ms. Caesar receives electric utility service from PECO. Tr. 8.
4. Ms. Caesar's home is a two-story brick single home with a basement. It is approximately 1,500 square feet. Tr. 9.
5. The electric meter is located outside of the house to the left of Ms. Caesar's dining room. Tr. 9.
6. Ms. Caesar has lived at this address for approximately 4.5 years. Tr. 10.
7. Ms. Caesar believes that her home currently has an analog meter, which she would like to retain. Tr. 9-10, 27. She does not believe that her current meter transmits using radiofrequency transmissions. Tr. 28.
8. Ms. Caesar's primary care physician is Dr. Rakel, who wrote a letter on Ms. Caesar's behalf (dated June 21, 2017). Tr. 12, 23, 41-42, Complainant's Exh. 1.
9. Ms. Caesar grows and makes her own medicines, cleaning solvents, and skin care products. She avoids all chemicals because she is sensitive to them. She believes that PECO's AMI meter will make her sick. Tr. 12.
10. Ms. Caesar carries a cell phone but uses it infrequently, Tr. 12, by which she means about ½ hour per day. Tr. 40. She leaves the phone on when not using it so that patients can contact her. Tr. 40-41.

11. Ms. Caesar does not have a microwave. She has a TV, but it is not a smart TV. Her home has wi-fi, Tr. 28, but at night she turns off her router, and she intends to figure out a way to hardwire her computer connection. She uses wi-fi about two hours per day. Tr. 13.
12. Ms. Caesar testified that she is sensitive to electromagnetic radiation. She stated that she knows this because when she has been in environments where there are a lot of wireless devices she feels it in her body and will start to get sick if overexposed to it. She reports experiencing such symptoms as headaches, depression, and anxiety, which she describes as being both psychological and physical symptoms. Tr. 13.
13. She testified that has not recently suffered from electromagnetic sensitivity because she tries to avoid situations with high exposure. However, she first became aware of her sensitivity in public buildings at some time in the past, when she lived in Massachusetts. She doesn't like to be around cell phones. If she leaves her router on at night, she feels something. Tr. 14-15.
14. Ms. Caesar is also concerned about privacy and surveillance. For example, if a patient has an Apple Watch, she will tell the patient to remove the Apple Watch so that they cannot record their conversation. She feels that if data is collected on her it is a violation of her rights. Tr. 15.
15. Ms. Caesar does not want "all of my [electric] usage in my home to be surveyed by PECO or by anybody. A sacred place for me is the privacy of my home." Tr. 15-16. One of the reasons for Mr. Caesar's privacy concern is that she believes that PECO AMI meters individually identify electrical devices inside the home and make a record of when the individual devices are operating. Tr. 33, 55-56.
15. When asked about the basis for her health concerns, Ms. Caesar stated that: "The letter from Dr. Rakel really is the basis on which I'm basing my case." Tr. 16. In addition to the Rakel letter, Ms. Caesar reviewed information that she located through her own research. Tr. 19.

She is concerned by the statement in Dr. Rakel's letter that the World Health Organization "is saying that they believe smart meter radiation is a Class 2B carcinogen." Tr. 19.

16. Ms. Caesar does not believe that there is "proof that they [AMI meters] are safe." She understands that there is controversy about the research she read, but she is certain there is no proof that AMI meters are safe, and until such proof exists she believes that installing an AMI meter would be a human experiment without her consent. Tr. 19-20.

17. Ms. Caesar is concerned that she cannot turn off an AMI meter; that she cannot control it the way she controls her router when she turns the router off at night. Tr. 20-21.

18. Ms. Caesar is also concerned about fire safety because "there are documented fires throughout the country and I worry about that." Tr. 24.

19. One of the documents relied upon by Ms. Caesar was issued by the National Institute of Building Sciences and was titled "IEQ Indoor Environmental Quality." The document contains a short section on "Electromagnetic Fields." The IEQ document first states that, according to the National Institute for Occupational Safety and Health, "scientific studies have raised questions about the possible health effects of EMFs." The IEQ then discusses possible accommodations to be made for those who want to reduce their EMF exposure. The accommodative measures noted in this document are (1) informing workers and employers about possible hazards of magnetic fields, (2) increasing workers' distance from EMF sources, (3) using low-EMF designs wherever possible, and (4) reducing EMF exposure times. Tr. 36-37; PECO Cross Exh. 1.

20. Dr. Rakel's letter states that Ms. Caesar is sensitive to extremely low frequency electromagnetic fields ("EMF") and radio frequency ("RF") fields, but the doctor did not perform any diagnostic tests prior to making that diagnosis. Tr. 41.

21. Ms. Caesar asked Dr. Rakel to write the letter on her behalf. Tr. 42. Ms. Caesar stated that she gave Dr. Rakel some information, and then they talked. “So I did give her some information and she looked it over and she wrote it based on some dialogue and some of the information that I gave her.” Tr. 42.
22. On cross-examination, Ms. Caesar admitted that Dr. Rakel was not the author of the letter signed by her. Rather, the first several paragraphs of the letter signed by Dr. Rakel were a form letter from the website named OAWHealth, which keeps the form letter online with the statement: “Below is a form letter that EMF sensitive individuals can give to their doctor to sign in order to ask for an accommodation from the effects of Smart Meters.” Ms. Caesar took the form letter from that website and provided it to her doctor, along with a few additional paragraphs that Ms. Caesar drafted. At this point in the cross-examination, Ms. Caesar claimed that she had never said that her doctor “wrote” the letter, only that she “read it and agreed with it and put her name on it.” Tr. 43-49; PECO Cross Exh. 2.
23. Ms. Caesar spends about 20 hours per week in her office, which is in an eight-story professional building. Tr. 52, 55.

Testimony of Glenn Pritchard

24. Glenn Pritchard is PECO’s Manager of Advanced Grid Operations. Tr. 58.
25. Mr. Pritchard was recognized as an expert in the design, operation, and technology of Advanced Meter Installations. Tr. 60.
26. Ms. Caesar’s office building has a PECO electric AMI meter and three PECO gas AMI modules. Tr. 61.
27. From approximately 2000 until April 2017, PECO used an AMR meter system that was comprised of transmit-only meters that transmitted using radio frequencies. Approximately

1.7 million electric AMR meters and 500,000 gas AMR meters were deployed. That system was shut down in April 2017. Tr. 61-63.

28. The meter that is currently on the Caesar residence is an AMR meter. It transmits using radio frequencies. Tr. 63.

29. The AMR meters transmitted every five minutes, or 288 times per day, for 20 milliseconds per transmission, for a total of 5.76 seconds of transmission time. Tr. 63-64, Exh. GP-3. The Caesar meter has been transmitting with that periodicity the entire time she has lived at that residence and continues to transmit at that periodicity today. Tr. 64.

30. PECO installed its AMI meter system in response to Pennsylvania Act 129 of 2008. Installation of AMI meters began in 2012. Tr. 64-65.

31. PECO's AMI meters have two radios: (1) a FlexNet module for communications with the backbone system; and (2) a ZigBee radio for communications with devices in the home. The FlexNet module transmits six to eight times per day for approximately 70 milliseconds. The ZigBee transmits every 30 seconds until it pairs with a device; in the most recent AMI meter style the ZigBee can be remotely turned off. The total transmission time of the two radios is approximately 2.5 seconds per day. Tr. 66-68, PECO Exh. GP-5.

32. There are several types of AMI systems commercially available. PECO chose the AMI system design that uses the lowest number of radiofrequency transmissions. It thus can be defined as a system with a "low-level EMF design," as recommended in the accommodation discussion in the IEQ document. Tr. 68-70, 84.

33. The AMI meters that PECO uses on its system come from the factory set to transmit every 15 minutes, or 96 times per day. As soon as PECO deploys an AMI meter, the AMI meter is put through a process to "tune down" the number of transmissions to the minimum level that is

consistent with efficient operation of the system. As a result of this “tune down” process, PECO’s AMI meters do not transmit 96 times per day as originally programmed; they transmit an average of 6 to 8 times per day. This has the result of reducing EMF exposure times, as recommended in the accommodation discussion of the IEQ document. Tr.70-71, 85.

34. PECO offers an Aclara AMI meter that does not have a ZigBee radio. This has the result of reducing EMF exposure times, as recommended in the accommodation discussion of the IEQ document. Tr. 71, 84.

35. PECO’s AMI meters meet multiple standards set by the American National Standards Institute, including standards to ensure fire safety. Tr. 71-72.

36. PECO’s AMI meters meet Underwriters’ Laboratory (“UL”) standard 2735, which is also a fire safety standard. UL 2735 was developed in 2013, after the Landis + Gyr meters were manufactured, but the Landis + Gyr meters were later tested for compliance with UL 2735 and passed that testing. The Aclara meters were manufactured under UL 2735 and are UL listed and have a UL stamp. Tr. 72-74.

37. PECO has 1.6 million Landis + Gyr and Aclara AMI meters deployed and has not had any fire or catastrophic events caused by those AMI meters. Tr. 74, 94-95.

38. In Mr. Pritchard’s expert opinion, PECO’s AMI meters do not pose a risk of fire. Tr. 74.

The AMI meter also has a new functionality that allows it to detect and report if the customer-owned meter socket is causing the area around the AMI meter to heat up (a phenomenon known as a “hot socket”). Consequently, as compared to the AMR meter that is currently on Ms. Caesar’s home, the AMI meter is safer when it comes to protecting against fires. Tr. 101-02.

39. PECO's AMI meters record the household energy use once an hour. Tr. 75. They do not have the capability to identify when individual electrical devices within the home are being operated. Tr. 77, 89-90.
40. Data from the AMI meter is securely transmitted to the Tower Gateway Basestation using encryption methods equivalent to those used in internet banking. Tr. 75-76. Even if a transmission was intercepted by a hacker, criminal, blackmailer, corrupt law enforcement, power company employee or other unidentified person, they could make no productive use of the data because they would not have the encryption keys. Tr. 78-80. The encryption used on the meters has been favorably reviewed by the National Institute of Standards and Technology and has received high accolades. Tr. 92.
41. The AMI meter data, once received by PECO, is used only for billing and limited operational purposes, such as dispatching crews for repairs in storms. Employee access to the data is limited to those who need the data to perform their business function. PECO cannot and does not release the meter data to third parties unless the customer requests that it be released to an alternative energy generation supplier. Tr. 76-77, 80-81.
42. Personally-identifying information, such as name, address, account information and billing information is not stored in the AMI meter and is not part of the data transmission made by the AMI meter. Tr. 78.
43. PECO's AMI meters do not have the capability to monitor household occupancy or information about daily habits or activities. Tr. 77-78. The AMI meters do not create a history of household activities. Tr. 79. The meter does not have the capability to determine medical conditions of people in the home, nor their sexual activities, the physical location of

people in the homes, vacancy patterns, or personal information and habits of the occupants.

Tr. 80.

44. Customers own the meter socket and, within certain limits, can decide where it will be located. If the customer moves the meter socket to a new, distant, location, then PECO will install the AMI meter at that new meter socket location. Tr. 81. Under PECO's Tariff rules, the cost of meter socket relocation, as well as the cost of any changes to PECO's system that may be needed to provide service to the new location, are the responsibility of the customer.

Tr. 82.

45. Relocating the meter socket and the AMI meter to a new, more distant, location, has the result of increasing distance from EMF sources, as recommended in the accommodation discussion of the IEQ document. Tr. 82.

46. PECO's Tariff allows for commercial competitors, referred to as Advanced Meter Service Providers, to enter the market and provide alternative metering services. None have done so to date. Tr. 83.

47. PECO began to install AMI meters in 2012. It delayed installation at refusal customers, such as Ms. Caesar, for six years as an accommodation to their concerns. However, because the AMR system was shut down in April 2017, that accommodation is no longer available. Tr. 83-84.

Testimony of Christopher Davis, Ph.D.

48. Dr. Christopher Davis is a Ph.D. physicist who is the Minta Martin Professor of Engineering and Professor of Electrical and Computer Engineering at the University of Maryland. Tr. 108-09, PECO Exh. CD-1.

49. Dr. Davis was recognized as an expert in the fields of physics, biophysics, chemistry, electrical engineering, electromagnetics, bioelectromagnetics, radiofrequency electromagnetics, and dosimetry. Tr. 109.
50. The FCC has safety standards that explain the maximum permissible exposure (“MPE”) that people can be exposed to if they are near a radiofrequency transmitter. The FCC’s MPEs are designed to avoid human health effects from exposure to high levels of radiofrequency fields; conversely, exposures below the MPE levels do not cause health effects. Tr. 111-12. 131-32; PECO Exh. CD-3.
51. PECO’s AMI meters do not create ionizing radiation and the transmissions from them are not capable of breaking chemical bonds. Tr. 112-14; PECO Exh. CD-4.
52. The radiofrequency transmissions from PECO’s AMI meters are approximately 5.8 million times lower than the FCC’s MPE. Tr. 115; PECO Exh. CD-5.
53. The FCC’s MPE’s are calculated on a 30-minute average exposure. Even the instantaneous peak transmissions from a PECO AMI meter are approximately 40 times smaller than the amount they are allowed to transmit on an averaged basis. Tr. 115-16; PECO Exh. CD-6.
54. The radiofrequency transmissions from PECO’s AMI meters are approximately 4.4 million times lower than the guidelines of the International Commission on Non-Ionizing Radiation Protection. Tr. 116-17; PECO Exh. CD-7.
55. People are commonly exposed to radiofrequency fields from a variety of sources, including such common devices as cell towers, UHF transmitters, cell phones, and microwave ovens. Tr. 117-18; PECO Exh. CD-8.
56. The Caesar residence is continuously exposed to radiofrequency transmissions from UHF TV transmitters. At the Caesar residence, the background exposure to radio frequency fields

from UHF stations is 3,000 times larger than the exposure of continuously sitting one meter in front of an AMI meter 24/7. Tr. 118-19; PECO Exh. CD-9.

57. Given Ms. Caesar's estimate that she uses wi-fi two hours per day, she would need to sit directly in front of a PECO AMI meter for 2,000 years to get the same exposure as she gets from one year of her current wi-fi usage. Tr. 119-20.

58. Given Ms. Caesar's estimate that she uses her cell phone ½ hour per day and leaves it on the rest of the day in order to be able to receive calls, she would need to sit directly in front of a PECO AMI meter for 322 years to get the same exposure as she gets from one year of her current cell phone usage. Tr. 120-22.

59. PECO's AMI meters will reduce the radiofrequency exposure from PECO's existing AMR meters by 79%. Tr. 122; PECO Exh. CD-10.

60. In Dr. Davis's opinion: (1) the levels of radio frequency fields from PECO's AMI meters comply with the FCC safety limits that apply to smart meters, and (2) there is no reliable scientific basis to conclude that radiofrequency fields from PECO's AMI meters are capable of producing any adverse biological effects. Tr. 122-23; PECO Exh. CD-13.

Testimony of Mark Israel, M.D.

61. Mark Israel is a medical doctor who is Professor of Systems Biology and Pediatrics and Medicine at Dartmouth Medical School. He is also Executive Director of the Israel Cancer Research Fund. Tr. 135-36; PECO Exh. MI-1.

62. Dr. Israel was recognized as an expert in medicine, medical research, and radiofrequency and electromagnetic fields and health. Tr. 136.

63. Dr. Israel reviewed the scientific research literature that examine the question of whether there is a relationship between exposure to radiofrequency fields or other frequencies of EMF

and people who claim to have electromagnetic hypersensitivity, or EHS. Dr. Israel prefers to use the term designated by the World Health Organization of “idiopathic environmental intolerance,” or “IEI,” because that term is more medically neutral in that it recognizes that the cause of the symptoms reported by these individuals is not known. His review covered over 50 published studies, a subset of which he discussed in detail. Those studies show that IEI, EHS, and the variety of symptoms attributed to it are not caused by radiofrequency fields. Tr. 137-42; PECO Exh. MI-3.

64. Dr. Israel reviewed the letter signed by Dr. Rakel. It did not report that Dr. Rakel conducted any examination of diagnostic tests of Ms. Caesar and did not report the results of any tests done on Ms. Caesar. Dr. Israel reviewed the research publications that were cited in the letter signed by Dr. Rakel and concluded that those research publications do not support the conclusion that exposure to radiofrequency fields causes any of the health effects discussed in the letter signed by Dr. Rakel. Tr. 142-46.

65. The letter signed by Dr. Rakel states that “the World Health Organization classified Smart Meter radiation as a Class 2B carcinogen.” In fact, the International Agency for Research on Cancer (“IARC”) (not the World Health Organization, or “WHO”) categorizes cell phone radiofrequency fields (not smart meter fields) in its Category 2B. Category 2B means that the agency classifies cell phone fields as a “possible” carcinogen, meaning that the evidence is limited and is not sufficient to classify it as a probably carcinogen. Neither the IARC or the WHO has classified radiofrequency fields from AMI meters as being a possible carcinogen. Tr. 147-49.

66. The letter signed by Dr. Rakel also refers to and relies upon the “Bioinitiative Report.” Dr. Israel reviewed the Bioinitiative Report, as well as the reviews of the Report from science

and health agencies. He agrees with the conclusion of the Health Council of Netherlands that “the Bioinitiative Report is not an objective and balanced reflection of the current state of scientific knowledge.” The Bioinitiative Report is contradicted by reviews of many recognized public health authorities. Tr. 149-52; PECO Exh. MI-3.

67. The letter that Dr. Rakel signed also refers to and relies upon statements by the American Academy of Environmental Science (“AAEM”). The AAEM statements are based upon a selective review of the science and are contradicted by reviews of many recognized public health authorities. Tr. 152-53; PECO Exh. MI-3.

68. Dr. Israel’s expert opinion is that there is no scientific basis on which to conclude that radiofrequency fields from PECO’s AMR or AMI could cause, contribute to, or exacerbate any symptoms, including electrical hypersensitivity, claimed by Ms. Caesar. Tr. 153-54; PECO Exh. MI-3.

Summary of Argument

Complainant has the burden of proof in this proceeding.

After a full evidentiary hearing, Ms. Caesar did not prove any of her claims by a preponderance of the evidence. To the contrary, PECO provided substantial, persuasive evidence that its AMI meters will not cause or contribute to any adverse health effect or exacerbate any illness. Moreover, PECO has provided reasonable accommodations to address Ms. Caesar's concerns about her health. PECO also has demonstrated that Ms. Caesar's privacy concerns are not well-founded; and that AMI meter do not impose an unreasonable risk of fires. Therefore, Ms. Caesar's Complaint should be dismissed.

Argument

I. Burden of Proof – The Complainant Has the Burden of Proof

It is axiomatic in all Commission formal complaint proceedings that the Complainant has the burden of proof. *Samuel J. Lansberry, Inc. v. Pa. PUC*, 578 A.2d 600 (Pa. Cmwlth. 1990), *alloc. denied*, 529 Pa. 654, 602 A.2d 863 (1992).

The Commission has recently affirmed that the normal burden of proof rule applies to AMI/health claims. *Frompovich v PECO*, C-2015-2474602 (Opinion and Order, May 3, 2018) (pp. 12-14); *Mary Paul v PECO*, C-2015-2475355 (Opinion and Order, June 14, 2018) (pp. 11-13).

Ms. Caesar claims that PECO's AMI meter will harm her health, violate her privacy, and cause a fire. In order to prevail, she must prove each of those claims by a preponderance of the evidence. As demonstrated in the remainder of this Brief, she did not do so.

II. Ms. Caesar did not prove, by a preponderance of the evidence, that PECO's AMI meter will harm her health, spy on her, or cause a fire

A. Health

Although Ms. Caesar discussed some research she had read on the internet, she testified that her health case was primarily based on the letter that she said Dr. Rakel had written at her request. Tr. 16. On cross-examination, however, PECO demonstrated that the letter that Dr. Rakel signed was not written by her; it is a form letter from an activist website, with a few additional paragraphs written by Ms. Caesar (not Dr. Rakel). Tr. 43-49; PECO Cross Exh. 2.

More importantly, Dr. Mark Israel reviewed the letter signed by Dr. Rakel and found that, even aside the fact that it is an internet form letter, there are substantial reasons not to rely upon it. First, it did not report that Dr. Rakel conducted any examination of Ms. Caesar and did not

report the results of any tests done on Ms. Caesar. Second, he reviewed the various publications that were cited in the letter Dr. Rakel signed and determined that they are not reliable sources of information, and that they do not support the conclusions made in the letter Dr. Rakel signed. Tr. 142-53; PECO Exh. MI-3.

For its part, PECO presented substantial persuasive testimony that its AMI meters will not cause, contribute to, or exacerbate Ms. Caesar's adverse health conditions. This testimony included the testimony of Dr. Christopher Davis. Dr. Christopher Davis is a Ph.D. physicist who is the Minta Martin Professor of Engineering and Professor of Electrical and Computer Engineering at the University of Maryland. Tr. 108-09, PECO Exh. CD-1. Dr. Davis was recognized as an expert in the fields of physics, biophysics, chemistry, electrical engineering, electromagnetics, bioelectromagnetics, radiofrequency electromagnetics, and dosimetry. Tr. 109. Dr. Davis testified that:

- The FCC has safety standards that explain the maximum permissible exposure ("MPE") that people can be exposed to if they are near a radiofrequency transmitter. The FCC's MPEs are designed to avoid human health effects from exposure to high levels of radiofrequency fields; conversely, exposures below the MPE levels do not cause health effects. Tr. 111-12. 131-32; PECO Exh. CD-3.
- PECO's AMI meters do not create ionizing radiation and the transmissions from them are not capable of breaking chemical bonds. Tr. 112-14; PECO Exh. CD-4.
- The radiofrequency transmissions from PECO's AMI meters are approximately 5.8 million times lower than the FCC's MPE. Tr. 115; PECO Exh. CD-5.
- The FCC's MPE's are calculated on a 30-minute average exposure. Even the instantaneous peak transmissions from a PECO AMI meter are approximately 40 times smaller than the amount they are allowed to transmit on an averaged basis. Tr. 115-16; PECO Exh. CD-6.
- The radiofrequency transmissions from PECO's AMI meters are approximately 4.4 million times lower than the guidelines of the International Commission on Non-Ionizing Radiation Protection. Tr. 116-17; PECO Exh. CD-7.

- People are commonly exposed to radiofrequency fields from a variety of sources, including such common devices as cell towers, UHF transmitters, cell phones, and microwave ovens. Tr. 117-18; PECO Exh. CD-8.
- The Caesar residence is continuously exposed to radiofrequency transmissions from UHF TV transmitters. At the Caesar residence, the background exposure to radio frequency fields from UHF stations is 3,000 times larger than the exposure of continuously sitting one meter in front of an AMI meter 24/7. Tr. 118-19; PECO Exh. CD-9.
- Given Ms. Caesar's estimate that she uses wi-fi two hours per day, she would need to sit directly in front of a PECO AMI meter for 2,000 years to get the same exposure as she gets from one year of her current wi-fi usage. Tr. 119-20.
- Given Ms. Caesar's estimate that she uses her cell phone ½ hour per day and leaves it on the rest of the day in order to be able to receive calls, she would need to sit directly in front of a PECO AMI meter for 322 years to get the same exposure as she gets from one year of her current cell phone usage. Tr. 120-22.
- PECO's AMI meters will reduce the radiofrequency exposure from PECO's existing AMR meters by 79%. Tr. 122; PECO Exh. CD-10.
- In Dr. Davis's opinion: (1) the levels of radio frequency fields from PECO's AMI meters comply with the FCC safety limits that apply to smart meters, and (2) there is no reliable scientific basis to conclude that radiofrequency fields from PECO's AMI meters are capable of producing any adverse biological effects. Tr. 122-23; PECO Exh. CD-13.

PECO also presented the testimony of Dr. Mark Israel. Mark Israel is a medical doctor and is a Professor of Systems Biology and Pediatrics and Medicine at Dartmouth Medical School. He is also Executive Director of the Israel Cancer Research Fund. Tr. 135-36; PECO Exh. MI-1. Dr. Israel was recognized as an expert in medicine, medical research, and radiofrequency and electromagnetic fields and health. Tr. 136.

In addition to analyzing the letter signed by Dr. Rakel (as described above), Dr. Israel reviewed the scientific research literature that examine the question of whether there is a relationship between exposure to radiofrequency fields or other frequencies of EMF and people who claim to have electromagnetic hypersensitivity, or EHS. Dr. Israel prefers to use the term designated by the World Health Organization of "idiopathic environmental intolerance," or

“IEI,” because that term is more medically neutral in that it recognizes that the cause of the symptoms reported by these individuals is not known. His review covered over 50 published studies, a subset of which he discussed in detail. Those studies show that IEI, EHS, and the variety of symptoms attributed to it are not caused by radiofrequency fields. Tr. 137-42; PECO Exh. MI-3.

Dr. Israel’s expert opinion is that there is no scientific basis on which to conclude that radiofrequency fields from PECO’s AMR or AMI could cause, contribute to, or exacerbate any symptoms, including electrical hypersensitivity, claimed by Ms. Caesar. Tr. 153-54; PECO Exh. MI-3.

B. Accommodations

In the seminal *Kreider Order* that initiated all AMI/health evidentiary hearings before the Commission, the Commission noted that, while the relief of an “opt out” is not available, such litigation could explore possible alternative remedies: “Given the state of the record at this point in the proceeding, we believe it is premature to conclude that the facts and the law absolutely preclude any possible remedy. It may be possible, for example, for the Respondent to install the smart meter in a different location other than outside of the Complainant’s bedroom or to use a different type of smart meter at this Complainant’s home. In any event, it is for the ALJ to determine what remedy to recommend, in the event that she finds a violation after a full evidentiary hearing.” *Susan Kreider v PECO Energy Company*, P-2015-2495064 (January 28, 2016 Opinion and Order) at 23.

In subsequent litigation, including the *Caesar* docket, the parties have used the term “accommodation” to refer to these possible alternative remedies. Ms. Caesar located an interesting document issued by the National Institute of Building Sciences and titled “IEQ Indoor

Environmental Quality.” The document contains a short section on “Electromagnetic Fields.” The IEQ document notes that there are “questions” about “possible” health effects of exposure to EMF, and then suggests a series of steps that it would recommend as possible accommodations to an employee who claims that they are sensitive to exposure to EMF. The accommodations suggested in the IEQ document are: (1) informing workers and employers about possible hazards of magnetic fields, (2) increasing workers’ distance from EMF sources, (3) using low-EMF designs wherever possible, and (4) reducing EMF exposure times. Tr. 36-37; PECO Cross Exh. 1.

As discussed in length in Mr. Pritchard’s testimony, the accommodations offered by PECO match and even exceed the kinds of accommodations recommended by the IEQ document. Mr. Pritchard testified that:

- There are several types of AMI systems commercially available. PECO chose the AMI system design that uses the lowest number of radiofrequency transmissions. It thus can be defined as a system with a “low-level EMF design,” as recommended in the accommodation discussion in the IEQ document. Tr. 68-70, 84.
- The AMI meters that PECO uses on its system come from the factory set to transmit every 15 minutes, or 96 times per day. As soon as PECO deploys an AMI meter, the AMI meter is put through a process to “tune down” the number of transmissions to the minimum level that is consistent with efficient operation of the system. As a result of this “tune down” process, PECO’s AMI meters do not transmit 96 times per day as originally programmed; they transmit an average of 6 to 8 times per day. This has the result of reducing EMF exposure times, as recommended in the accommodation discussion of the IEQ document. Tr.70-71, 85.
- PECO offers an Aclara AMI meter that does not have a ZigBee radio. This has the result of reducing EMF exposure times, as recommended in the accommodation discussion of the IEQ document. Tr. 71, 84.
- Customers own the meter socket and, within certain limits, can decide where it will be located. If the customer moves the meter socket to a new, distant, location, then PECO will install the AMI meter at that new meter socket location. Tr. 81. Relocating the meter socket and the AMI meter to a new, more distant, location, has the result of increasing distance from EMF sources, as recommended in the accommodation discussion of the IEQ document. Tr. 82.

These accommodations, which PECO has made available to Ms. Caesar, are analogous to the accommodations recommended in the IEQ document. Moreover, PECO offers accommodations that go beyond the IEQ document:

- PECO's Tariff allows for commercial competitors, referred to as Advanced Meter Service Providers, to enter the market and provide alternative metering services. None have done so to date. Tr. 83.
- PECO began to install AMI meters in 2012. It delayed installation at refusal customers, such as Ms. Caesar, for six years as an accommodation to their concerns. However, because the AMR system was shut down in April 2017, that accommodation is no longer available. Tr. 83-84.

In sum, it is clear that PECO has offered reasonable accommodations to Ms. Caesar.

C. Privacy

Ms. Caesar also expressed concern that PECO's AMI meters would violate her privacy. Although she was given multiple opportunities to describe the basis for this concern, ultimately she simply stated that, while doing research about AMI meters, she had read that AMI meters invade privacy. Tr. 15-16, 33, 55-56.

Ms. Caesar's privacy concerns were addressed by Glenn Pritchard, who is an expert in the design, operation, and technology of Advanced Meter Installations. He testified that:

- PECO's AMI meters record the household energy use once an hour. Tr. 75. They do not have the capability to identify when individual electrical devices within the home are being operated. Tr. 77, 89-90. PECO's AMI meters do not have the capability to monitor household occupancy or information about daily habits or activities. Tr. 77-78. The AMI meters do not create a history of household activities. Tr. 79. The meter does not have the capability to determine medical conditions of people in the home, nor their sexual activities, the physical location of people in the homes, vacancy patterns, or personal information and habits of the occupants. Tr. 80.
- Personally-identifying information, such as name, address, account information and billing information is not stored in the AMI meter and is not part of the data transmission made by the AMI meter. Tr. 78.

- Data from the AMI meter is securely transmitted to the Tower Gateway Basestation using encryption methods equivalent to those used in internet banking. Tr. 75-76 Even if a transmission was intercepted by a hacker, criminal, blackmailer, corrupt law enforcement, power company employee or other unidentified person, they could make no productive use of the data because they would not have the encryption keys. Tr. 78-80. The encryption used on the meters has been favorably reviewed by the National Institute of Standards and Technology and has received high accolades. Tr. 92
- The AMI meter data, once received by PECO, is used only for billing and limited operational purposes, such as dispatching crews for repairs in storms. Employee access to the data is limited to those who need the data to perform their business function. PECO cannot and does not release the meter data to third parties unless the customer requests that it be released to an alternative energy generation supplier. Tr. 76-77, 80-81.

The preponderance of evidence in this proceeding clearly demonstrates that concerns that PECO's AMI meters will compromise Mr. Caesar's privacy, security, or surveillance are not well-founded.

D. Fires

Ms. Caesar also expressed concerned about fire safety, stating that "there are documented fires throughout the country and I worry about that." Tr. 24-25. That was, effectively, her entire evidentiary case on fires.

Ms. Caesar's fire concerns were addressed by Glenn Pritchard. He testified that:

- PECO's AMI meters meet multiple standards set by the American National Standards Institute, including standards to ensure fire safety. Tr. 71-72.
- PECO's AMI meters meet Underwriters' Laboratory ("UL") standard 2735, which is also a fire safety standard. UL 2735 was developed in 2013, after the Landis + Gyr meters were manufactured, but the Landis + Gyr meters were later tested for compliance with UL 2735 and passed that testing. The Aclara meters were manufactured under UL 2735 and are UL listed and have a UL stamp. Tr. 72-74.
- PECO has 1.6 million Landis + Gyr and Aclara AMI meters deployed, and has not had any fire or catastrophic events caused by those AMI meters. Tr. 74, 94-95.

- In Mr. Pritchard's expert opinion, PECO's AMI meters do not pose a risk of fire. Tr. 74. The AMI meter also has a new functionality that allows it to detect and report if the customer-owned meter socket is causing the AMI meter to heat up (a phenomenon known as a "hot socket"). Consequently, as compared to the AMR meter that is currently on Ms. Caesar's home, the AMI meter is safer when it comes to protecting against fires. Tr. 101-02.

The preponderance of evidence in this proceeding clearly demonstrates that Ms. Caesar's concerns about fires are unproven and unfounded.

Conclusion

PECO respectfully submits that Ms. Caesar did not prove any of her claims by a preponderance of the evidence. To the contrary, PECO provided substantial, persuasive evidence that its AMI meters will not cause or contribute to any adverse health effect or exacerbate any illness. Moreover, PECO has provided reasonable accommodations to address Ms. Caesar's concerns about her health. PECO also demonstrated that Ms. Caesar's privacy concerns are not well-founded; and that AMI meter do not impose an unreasonable risk of fires.

Therefore, Ms. Caesar's Complaint should be dismissed.

Respectfully submitted,



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