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October 24, 2017

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

RE: Maria Povacz v. PECO Energy Company
Docket No. C-2015-2475023

Dear Ms. Chiavetta:

Enclosed for filing with the Commission is the ***Main Brief of PECO Energy Company***.

Very truly yours,

Ward L. Smith
Counsel for PECO Energy Company

WS/ab
Enclosure

cc: Darlene D. Heep, ALJ
Certificate of Service

#4559415

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Maria Povacz	:	
	:	Docket No. C-2015-2475023
v.	:	
	:	
PECO Energy Company	:	

CERTIFICATE OF SERVICE

I, Ward L. Smith, hereby certify that on October 23, 2017, I served a copy of the Main Brief of PECO Energy Company via e-mail to:

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Dated at Philadelphia, Pennsylvania, October 24, 2017

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	:	
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	:	
PECO Energy Company	:	

Main Brief of PECO Energy Company

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Introduction

The Complainants allege that PECO's installation of an Advanced Meter Installation ("AMI") meter or Advanced Meter Reader ("AMR") meter[1] at their residences violates 66 Pa. C.S. §1501 because, they claim, the radiofrequency fields that the AMI meter uses to communicate (both with the PECO backbone system and with smart appliances in the home) have harmed or will harm their health.

Complainant claim of harm is very carefully parsed. Complainants do not claim to have demonstrated, by a preponderance of the evidence, that PECO's AMI meters caused, contributed to, or exacerbated any health condition that they have. Nor do they claim to have demonstrated, by a preponderance of the evidence, that PECO's AMI meters *will* cause, contribute to, or exacerbate any health condition in the future. Moreover, the testimony of their own witnesses does not support such a conclusion.

Instead, their position revolves completely around their position that the burden and standard of proof they must meet is much, much, lower. The Complainants argue that in order to prevail, (1) they do not need to demonstrate that the AMI meters harmed or will harm them; they only need to prove the "potential" for harm[2]; (2) even if the potential for harm is not objectively

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[1] One Complainant – Ms. Murphy – claimed that PECO's AMR caused adverse health conditions between 2002 and 2015. For purposes of this Brief, the arguments are nearly identical as to whether Complainants have proved their allegations with respect to either the AMI meter or AMR meter. PECO therefore will generally only refer to AMI meters, but its arguments apply with equal force to any claims about AMR and AMI meters.

[2] "The Commission need not resolve the scientific disagreement between the parties to resolve these cases. The evidence at the very least shows *potential harm* to the Complainants from RF to Complainants from RF exposure such as that emitted from smart meters." (emphasis added). Murphy Main Brief, p. 2. Due to the differing length of Proposed Findings of Fact, there is some variation in pagination in the various Complainants' Main Briefs. However, because PECO is responding uniformly to all three Main Briefs, to avoid confusing citations PECO will only provide reference to the page numbers in the Murphy Main Brief.

demonstrated, they should nonetheless prevail as long as they "sincerely believe" the AMI meters will harm them[3]; and (3) that the Commission should conclude that the question of safety of AMI meters is "undecided -- neither proved nor disproved, with evidence on both sides of the issue" -- and that such a conclusion should lead to a ruling in favor of the Complainants.[4] In making those arguments, Complainants specifically suggest that the "ultimate burden of proof" should be placed on PECO, not on Complainants.[5]

That is not the correct burden or standard of proof to apply in this Commission complaint proceeding. As PECO demonstrates in the first section of this Brief, Complainants have the burden of proving their complaint by a preponderance of the evidence. In these AMI/health cases and related precedent, the Commission has made clear that if the Complainants merely demonstrate that the science is "undecided" – which is all Complainants now claim to have demonstrated – then they have not met their burden of proof and cannot prevail.

Moreover, the record evidence in this case does not lead to the conclusion that the science is "undecided," it leads to the conclusion that there is no reasonable medical basis to believe that radio frequency fields from PECO's AMI meters will cause, contribute to, or exacerbate the Complainants' health conditions. But whether the Commission accepts the evidentiary summary

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[3] "Forcing those Complainants to accept exposure to RF from smart meters *that they sincerely believe will further harm their health*, and forcing them to do so against their doctors' orders, offends fundamental principles of personal autonomy and constitutes unreasonable and unsafe utility service to Complainants in violation of section 1501 (emphasis added). Murphy Main Brief, p. 2.

[4] "The most that PECO could hope to prove in these proceedings regarding the safety of smart meters is that *the answer to this important question is currently undecided – neither proved nor disproved, with evidence on both sides of the issue.* With human safety in the balance, why should the Commission shift the burden of proof, and require Complainants to provide conclusive evidence that RF exposures can cause harm? The Commission should decline to follow PECO's suggestion regarding the ultimate burden of proof" (emphasis added). Murphy Main Brief, p. 61.

[5] *Id.*

of PECO or Complainants, when either one is viewed against the properly-stated burden and standard of proof, it is clear that Complainants did not prove their case by a preponderance of the evidence.

Finally, PECO notes that it has spent more than $750 million installing its AMI system. It would violate PECO's due process rights to allow that investment and deployment to be disrupted because there is "potential" for harm, or because Complainants' "sincerely believe" that PECO's technology will be harmful to them, or because the science is "undecided." Attempts to interfere with utility deployment of new facilities, done pursuant to a statutory mandate and a Commission-approved plan, must be held to a higher standard of proof than that.

Procedural History

PECO accepts the Procedural History set forth in Complainants' Main Briefs.

Proposed Findings of Fact

Testimony of Complainants and Treating Physicians

PECO accepts the Proposed Findings of Fact set forth in the Complainants' Main Briefs as an accurate rendition of the testimony given by Complainants and their treating physicians. Of course, where the testimony moves from historical factual recitation to opinion regarding causes of health effects, PECO does not agree that the testimony of these witnesses should be adopted as Findings of Fact. In addition, the Complainants and treating physicians may have been contradicted by other witnesses.

Testimony of Complainants' Witness Martin Pall, Ph.D.

In their Main Briefs, Complainants did not present Proposed Findings of Fact for the testimony of Martin Pall, Ph.D. stating (p. 27, fn 1) that they "will lighten the burden of evidentiary review on the Commission and otherwise simplify the issues by not calling attention to the voluminous testimony of Dr. Pall."

Testimony of Complainants' Witness Andrew Marino, Ph.D.

In their Main Briefs, Complainants did not present Proposed Finding of Fact for Dr. Marino's testimony. PECO notes, however, that Section 1 of the Argument section of the Complainants' Main Briefs ("The Commission Should Adopt the Expert Testimony of Dr. Marino As Correct and Well Supported by Science") is essentially a summary of Dr. Marino's testimony, with very little commentary or argument. It therefore can likely be repurposed as Proposed Findings of Fact.

Testimony of PECO Witness Brenda Eison

None of the issues addressed in Ms. Eison's testimony were briefed by Complainants, and PECO therefore did not prepare Proposed Findings of Fact for her testimony.

Testimony of PECO Witness Glenn Pritchard

PECO generally accepts the Proposed Finding of Fact with respect to the testimony of Glenn Pritchard as set forth in the Complainants' Main Briefs. However, PECO would add the following additional Proposed Findings of Fact from that testimony:

1. The customer decides where to put the meter socket, as long as that location meets the guidelines established in PECO's Electric Service Tariff. Tr. 115-16, PECO Exh. GP-3. PECO would install an AMI meter in a relocated meter socket if the Complainant chose to relocate her meter socket. If moving the meter board causes PECO to incur costs to extend its system to the new location, under PECO's tariff the customer is responsible for those costs. Murphy Rebuttal Testimony of Glenn Pritchard at 10; Povacz Rebuttal Testimony of Glenn Pritchard at 16; PECO Exh. GP-3.

2. An Advanced Meter Service Provider (AMSP) is a third party permitted by Section 14.1 of PECO's Electric Service Tariff to provide alternative meter technology to customers for compensation. Murphy Rebuttal Testimony of Glenn Pritchard at 11-12; Povacz Rebuttal Testimony of Glenn Pritchard at 16; PECO Exh. GP-3.

Testimony of PECO Witness Christopher Davis, Ph.D.

3. Dr. Christopher Davis is a professor of electrical and computer engineering at the University of Maryland in College Park who studies, researches, teaches, and serves on national and international panels related to physics, biophysics, electrical engineering, electromagnetics, radiofrequency exposure and dosimetry. Murphy Rebuttal Testimony of Christopher Davis at 1-7; Povacz Rebuttal Testimony of Christopher Davis at 1-7.

4. The Federal Communications Commission (FCC) has promulgated limits for the maximum permissible exposure to radiofrequency fields emitted by a Smart Meter as 0.6 mW/cm^2, calculated as an average exposure over time. Murphy Rebuttal Testimony of Christopher Davis at 13; Povacz Rebuttal Testimony of Christopher Davis at 13-14.

5. In setting its standards, the FCC considered claims of both thermal and non-thermal effects; it set the standards to avoid thermal effects because the scientific studies did not show any non-thermal effects. The FCC continues to consider whether there are adverse biological effects from non-thermal exposure levels, but considers the scientific evidence for such effects to be "ambiguous and unproven." Murphy Rebuttal Testimony of Christopher Davis at 14-15; Povacz Rebuttal Testimony of Christopher Davis at 14-16.

6. The average exposure from PECO's electric AMI meters is millions of times less than the FCC maximum permissible exposure levels. Murphy Rebuttal Testimony of Christopher Davis at 15-16; Povacz Rebuttal Testimony of Christopher Davis at 16; PECO Exh. CD-2.

7. The peak exposure from PECO's electric AMI meters is approximately 40 times smaller than the FCC limit for 30-minute average exposure. Murphy Rebuttal Testimony of Christopher Davis at 16; Povacz Rebuttal Testimony of Christopher Davis at 17. PECO Exh. CD-3.

8. The exposure from PECO's electric AMI meters is also millions of times less than the guidelines published by the International Commission on Non-Ionizing Radiation Protection. Murphy Rebuttal Testimony of Christopher Davis at 16-17; Povacz Rebuttal Testimony of Christopher Davis at 17;PECO Exh. CD-4.

9. In everyday life, people are exposed to radiofrequency field levels from many sources that are much higher than the radiofrequency fields associated with PECO's AMR or AMI meters. Murphy Rebuttal Testimony of Christopher Davis at 17; Povacz Rebuttal Testimony of Christopher Davis at 17-18; PECO Exh. CD-5.

10. The background exposure from UHF broadcasting is hundreds of times higher than the exposure from PECO's AMI meters. Murphy Rebuttal Testimony of Christopher Davis at 17; Povacz Rebuttal Testimony of Christopher Davis at 18. PECO Exh. CD-6.

11. Given the reported cell phone use of Complainants, their exposure to radiofrequency fields from cell phones is 1000s of times greater than from AMI meters. Murphy Rebuttal Testimony of Christopher Davis at 18.

12. The electric AMI meter will emit 83% less radiofrequency fields than does the existing electric AMR meter at Ms. Complainants' residences. Murphy Rebuttal Testimony of Christopher Davis at 18; Povacz Rebuttal Testimony of Christopher Davis at 18-19; PECO Exh. CD-8.

13. PECO's AMI meters do not produce "pulsed" fields. Murphy Rebuttal Testimony of Christopher Davis at 21-22; Povacz Rebuttal Testimony of Christopher Davis at 21-23.

14. Dr. Davis testified, to a reasonable degree of scientific certainty, that there is no reliable scientific basis to conclude that exposure to radio frequency fields from PECO's AMI meters is capable of causing any adverse biological effects in people, including the Complainants. Murphy Rebuttal Testimony of Christopher Davis at 24-25; Povacz Rebuttal Testimony of Christopher Davis at 24-25.

Testimony of PECO Witness Dr. Mark Israel, M.D.

15. Dr. Mark Israel attended the Albert Einstein College of Medicine, had an internship and residency at Harvard Medical School, has worked at the National Institutes of Health and been a professor of medicine and medical research at numerous medical schools. He has studied radiofrequency fields and health effects. Murphy Rebuttal Testimony of Mark Israel at 3-5; Povacz Rebuttal Testimony of Mark Israel at 3-5.

16. Dr. Israel began to examine the research on electromagnetic fields, including radiofrequency fields, and health effects during his tenure at the National Cancer Institute more than more than 25 years ago. He has continued to follow the research literature on

this subject since that time. Murphy Rebuttal Testimony of Mark Israel at 5-6; Povacz Rebuttal Testimony of Mark Israel at 5-6.

17. Dr. Israel conducted an evaluation of whether exposure to radiofrequency fields from PECO's AMI meters can cause, contribute to or exacerbate the conditions described by each of the Complainants. In that evaluation, he used the same methodology that he uses in the usual course of his medical work, which included searching medical and scientific databases, analyzing studies identified through that research, evaluating as a whole all of the studies that he determined were relevant to the claimed symptoms, including both studies that showed an effect and studies that did not show an effect, and review of the findings of public health agencies and organizations to see if they provided any insights Dr. Israel missed and to see if their conclusions were inconsistent with Dr. Israel's initial determinations. He then made his final medical evaluation. Murphy Rebuttal Testimony of Mark Israel at 7; Povacz Rebuttal Testimony of Mark Israel at 6-7.

18. Dr. Israel conducted the above-described evaluation for each of the symptoms or conditions identified by the Complainants and concluded, for each such symptom, that there is no reliable medical basis to conclude that radiofrequency fields from PECO's electric AMI meters caused, contributed to, or exacerbated, or will cause, contribute to, or exacerbate, any of the symptoms identified by Complainants. Murphy Rebuttal Testimony of Mark Israel at 11-31; Povacz Rebuttal Testimony of Mark Israel at 11-26; December 8, 2016 Povacz Transcript at 1470-1516.

19. Dr. Israel's overall medical opinion is that exposure to electromagnetic fields from PECO's smart meters have not been and will not be harmful to Complainants' health. He holds both his symptom-specific and overall medical opinions to a reasonable degree of medical certainty. Murphy Rebuttal Testimony of Mark Israel at 31-32; Povacz Rebuttal Testimony of Mark Israel at 26.

Summary of Argument

The Complainants have the burden of proving their claim that PECO's AMI meter has or will cause, contribute to, or exacerbate their adverse health. Complainants did not meet that burden. They relied exclusively on the testimony of Dr. Andrew Marino, who testified that, while he believes that there is potential or possible risk from exposure to AMI meters – that is, that they "could" cause harm -- there is "no evidence to warrant the statement" that a PECO AMI meter "will," "would," or "did" harm the Complainants.

PECO presented expert testimony that demonstrates:

- Radiofrequency fields from PECO's AMI meters are millions of times lower than the FCC's Maximum Permissible Exposure Limit (and also to international exposure guidelines)
- Radiofrequency fields from the new AMI meters are substantially less than the radiofrequency fields associated with the AMR meter that has been in place at Complaints' residences for many years
- Radiofrequency fields from the new AMI meters are substantially less than those regularly encountered in everyday life
- The scientific literature does not provide a reliable medical basis to conclude that radiofrequency fields associated with AMI meters could cause, contribute to, or aggravate health effects or conditions, including those being experienced by Complainants.

PECO' tariff allows a customer to choose the location of their meter board and socket; this provides a reasonable alternative for meter relocation. Complainants were offered but rejected this alternative. PECO also has a tariff provision that allows third party Advanced Meter Service Providers to offer competitive metering services, although none have currently obtained Commission licenses to do so.

Numerous other state utility commissions have reviewed the science on smart meters and health and concluded that AMI meters are safe and their use in the provision of utility service is reasonable.

Given the above, the installation and use of AMI meters constitutes "reasonable utility service" for purposes of 66 Pa. C.S. §1501.

Argument

I. The Complainants have the burden of proving, by a preponderance of the evidence, that PECO's AMI meter will cause, contribute to, or exacerbate their adverse health conditions

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), 66 Pa. C.S. §332(a).

"Burden of proof" means a duty to establish a fact by a preponderance of the evidence, or evidence more convincing, by even the smallest degree, than the evidence presented by the other party. *Se-Ling Hosiery v. Margulies*, 364 Pa. 54, 70 A.2d 854 (1950).

If a complainant establishes a *prima facie* case, the burden of going forward with the evidence shifts to the utility. If a utility does not rebut that evidence, a complainant will prevail. If the utility rebuts complainant's evidence, the burden of going forward with the evidence shifts back to a complainant, who must rebut the utility's evidence by a preponderance of the evidence. The burden of going forward with the evidence may shift from one party to another, but the burden of proof never shifts; it always remains on a complainant. *Replogle v. Pennsylvania Electric Company,* 54 Pa. PUC 528 (1980), and *Waldron v. Philadelphia Electric Company*, 54 Pa. PUC 98 (1980).

If Respondent submits evidence of "co-equal" weight to counter Complainant's evidence, Complainant has not satisfied the burden of proof unless additional evidence opposing Respondent's evidence is presented. *Morrissey v. PA Dept. of Highways,* 424 Pa. 87, 225 A.2d 895 (1967), and *Burleson v. Pa. Pub. Util. Comm'n.* 66 Pa.Cmwlth. Ct. 282, 443 A.2d 1373 (1982), aff'd. 501 Pa. 443, 461 A.2d 1234.

In the seminal Commission case allowing an AMI/health hearing – *Kreider v PECO* – the Commission made clear that the general rule applies to AMI/health proceedings. In its Jan. 28, 2016 *Kreider Order* (pp. 21-23), the Commission stated that:

> Holding a hearing in this case, to address Ms. Kreider's factual averments *regarding the specific health effects she experienced after the smart meter was installed* outside of her bedroom, will enable us to closely evaluate these claims *based on a fully developed evidentiary record.*
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> *******
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> [A]s we expressed in the *September 2015 Order*, while we find that the Complainant should have the opportunity to be heard on her averments regarding the "deleterious health symptoms" related to the smart meter, *the Complainant will have the burden of proof during the proceeding to demonstrate, by a preponderance of the evidence, that PECO is responsible or accountable for the problem described in the Complaint.* 66 Pa. C.S. § 332(a); *Samuel J. Lansberry, Inc. v. Pa. PUC*, 578 A.2d 600 (Pa. Cmwlth. 1990), alloc. denied, 529 Pa. 654, 602 A.2d 863 (1992). In order to carry this burden of proof, the Complainant may be required to present evidence in the form of medical documentation and/or expert testimony. *The ALJ's role in the proceeding 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 PECO's use of a smart meter to measure this Complainant's usage will constitute unsafe or unreasonable service in violation of Section 1501 under the circumstances in this case. *See, Letter of Notification of Philadelphia Electric Company, supra*, at 12-13 (stating that the ALJs role was to determine whether there was sufficient record evidence to support a finding that the petitioners would be adversely affected by the reconductoring of the transmission line at issue.) (emphasis added).[6]

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[6] Indeed, one of the instant Complainants, Laura Murphy, filed an *amicus* Brief in *Kreider* arguing in favor of evidentiary hearings on AMI/health claims and arguing that *proof of negative health effects – not potential or possibility or belief of effects – is "crucial to the determination"* of these cases. In her *amicus* Brief, Ms. Murphy argued that hearings should be granted specifically to examine health effects, stating:

> *Evidence of* disability and *negative health effects is crucial to the determination of whether PECO is providing unsafe service in violation of Section 1501. It will be impossible for the Commission to determine whether PECO's smart meters create an unsafe condition unless the adverse effects of the devices on the Complainants are known.*

Amicus Curiae Brief of Laura Sunstein Murphy, Kreider v PECO, C-2015-2469655 (August 7, 2015, p. 8) (emphasis added) (available on the Commission's website).

In their Main Briefs,[7] Complainants set forth their view of what they think they have the burden of proving – and conversely, the burden of proof that they think PECO bears:

> PECO proceeds from the absolute incorrect premise that in order to prevail in these proceedings, the Complainants must prove medical causation, i.e., that PECO's AMR or AMI smart meter caused health conditions for them or will interfere with their health. [But a claim of unreasonable utility service under section 1501] does not require proof of medical causation, a burden so high that it would eviscerate PECO's duty to provide safe and reasonable service. In enforcing section 1501, the Commission and PECO must be concerned with the *potential for harm*. If something is potentially harmful to the Complainants, it is both unsafe and unreasonable as to the Complainants (emphasis in original).

This argument essentially effects a revision or reversal of the normal burden of proof that is used in Commission complaint proceedings. Such a reversal would violate PECO's due process rights because, in response to a legislative mandate and in compliance with Commission orders, PECO has invested over $750 million to install an AMI system – and under the burden of proof proposed by Complainants, they would be allowed to disrupt that investment and deployment based *without proving that PECO's system causes any harm*. Simply, that is no way to run a utility system because it effectively gives veto power over any utility initiative to any customer who sincerely believes that the utility system has "potential for harm."

It will become apparent in the ensuing discussion that, even though the instant proceeding is an exercise of the Commission's quasi-judicial function, the Complainants seek to have the Commission apply a standard of proof that would normally be used only in a legislative or quasi-

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The *amicus* Brief was cited extensively in the *Kreider Order*, which should be understood as having granted the relief requested in this passage – hearings to allow the Complainants to provide evidence of negative health effects.

[7] The section of Complainants' Main Briefs that directly addresses legal arguments regarding burden of proof and standard of proof is labelled "There is No Requirement for Complainants to Prove Medical Causation as Though This Were a Toxic Tort Case." See Murphy Main Brief, pp. 75-77.

legislative proceeding, such as a rulemaking. Indeed, the Complainants' Briefs directly state (p. 23) that: "This Commission's role in deciding the issue is quasi-judicial and quasi-legislative. . . ." But this is a complaint proceeding, which is quasi-judicial in nature – not quasi-legislative. The standards used in the quasi-legislative rulemaking function are useful when the Commission is exercising its rulemaking function, but are not appropriate when, as here, the Commission is exercising its quasi-judicial function.

The Complainants correctly cite the Commission's *Kreider Order* as a seminal source of information regarding burden of proof in AMI/health cases, but before examining that *Order* we should first briefly review the Commonwealth Court's Order in *Romeo v PaPUC*, 498 C.D. 2016 (Feb. 8, 2017 Pa. Cmwlth), slip op. at 13 (emphasis added). In *Romeo*, the Court remanded a case to the PUC for an AMI/health evidentiary hearing and described the required scope of hearing as the establishment of *causation*:

> What was before the Commission was PECO's preliminary objections, in which all factual allegations are taken as true. Romeo claimed that the smart meters *cause* safety and fire hazards and have a negative health impact. Just because he cannot personally testify as to the health and safety effects does not mean that his complaint is legally insufficient. He could make out his claim through the testimony of others as well as other evidence that goes to that issue.

The *Romeo Order* is consistent with the *Kreider Order,* which provides clear direction as to the quasi-judicial nature of this proceeding, and to where we should look for guidance on the standard of proof to be used in a quasi-judicial proceeding that involves conflicting scientific claims regarding adverse health effects. The *Kreider Order* references the early 1990s *Letter of Notification* proceeding. That proceeding involved PECO's reconstruction of its Woodbourne-Heaton 230 kV transmission line (the "*Woodbourne-Heaton*" Order). The proceeding began when local residents (the "Protestants") became concerned that electric and/or magnetic fields ("EMF") associated with Woodbourne-Heaton transmission line would cause them to suffer

adverse health effects. The Protestants requested (and were ultimately granted) the opportunity for an evidentiary hearing to present evidence on "whether customers would be adversely affected by PECO's reconstruction of a transmission line *given the customer's allegations of . . . the risk of EMFs from the line causing negative health effects, including cancer.*" *Kreider* at 22 (emphasis added). In *Woodbourne-Heaton*, extensive scientific and medical testimony was presented by PECO, the Protestants, and the OCA.

In *Woodbourne-Heaton*, the Protestants made "risk" arguments that are markedly similar to the position taken by Complainants in the instant proceeding. The Commission characterized the Woodbourne-Heaton Protestants position, in material part, as follows:

> [Protestants position is that] [t]here is a risk first [because] the line has not complied with EMF safety standards because none are in place yet. In the light of the serious concerns of adverse health effects caused by EMF, to proceed with a line that complies with no EMF standards is unreasonable; that is a dictate of sound policy. There is also a risk because there are scientific studies that indicate adverse health effects of EMF exposure and many scientists who back these findings.
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> Thus, [the Commission concludes] that *Protestants do not*, on the basis of this record, *maintain that they have demonstrated by a preponderance of the evidence, adverse health effects from exposure to EMF. We discern that the record is inconclusive, and that the state of scientific debate is not in accord. It is this inconclusiveness which forms the basis of Protestant's concern*, and the basis of their adherence to the view that energization of the Woodbourne-Heaton line should be delayed.

Re Philadelphia Electric Company, 78 Pa.P.U.C. 486, WL 383052 (Pa.P.U.C.), Docket No. A-110550F055 (March 26, 1993) (slip op., pp. 7-8) (emphasis added).

In other words, the question posed in *Woodbourne-Heaton* was what outcome the Commission should reach, given the Protestants belief (and the Commission's conclusion) that

the science on EMF and health was "inconclusive." And that is almost exactly the issue posed by the Complainants' Main Briefs, where they state (p. 61):

> The most that PECO could hope to prove in these proceedings regarding the safety of smart meters is that the answer to this important question is currently undecided—neither proved nor disproved, with evidence on both sides of the issue. With human safety in the balance, why should the Commission shift the burden of proof, and require Complainants to provide conclusive evidence that RF exposure can cause harm? The Commission should decline to follow PECO's suggestion regarding the ultimate burden of proof.

Woodbourne-Heaton provides the framework for addressing that precise question, and the Commission was quite clear (pp. 73-72) that when such a body of evidence is adduced, the proper conclusion is that the Complainants have failed to meet their burden of proof (emphasis added):

> In view of all of the foregoing conflicting expert scientific studies, testimony and conclusions on the issue presented, i.e.,whether exposure to EMFs causes adverse human health effects, the evidence of record in this proceeding, taken as a whole, leads to the *ultimate finding and conclusion that the scientific studies at present are inconclusive; and therefore, the record evidence does not support a finding and/or conclusion that such exposure is harmful to human health. That is to say, that there has been no clear and convincing demonstration of such causality, nor is the preponderance of the evidence sufficient to support such a finding and/or conclusion. Thus, within the framework of the issue framed by the Commonwealth Court and the Commission in this case, it cannot be said that the record evidence supports a finding and/or conclusion that exposure to EMFs causes adverse human health effects. The scientific evidence of record is inconclusive at this point in time.*

The *Woodbourne-Heaton* Commission therefore entered an order (p. 85): "That *by reason of the inconclusive nature of scientific research* and studies to date, *the Protest is dismissed* in part insofar as it seeks a determination that exposure to EMFs causes adverse human health effects." (emphasis added).[8] The Woodbourne-Heaton transmission line was

[8] PECO maintained throughout the Woodbourne-Heaton proceeding – and maintains to this day -- that the science is not inconclusive; the correct conclusion is that it has not been scientifically demonstrated that electric and/or magnetic fields from the line cause or contribute to adverse health effects.

subsequently energized on the strength of that Order, and remains in service today, more than two decades later.

Woodbourne-Heaton thus provides a dispositive framework for the burden and standard of proof in the instant proceeding: If the Complainants prove that there is a body of conflicting and inconclusive science, or that the science is "undecided," then the Complainants have failed to meet their burden of proof, and cannot prevail. And that is what the Complainants claim to have demonstrated.

Moving on from the implications of *Woodbourne-Heaton*, the *Kreider Order* provides a separate, independent basis for concluding that, in order to prevail, the Complainants must prove that PECO's AMI meters will cause, contribute to, or exacerbate their adverse health conditions. The *Kreider Order* states (emphasis added) that the Complainants "will have the burden of proof during the proceeding to demonstrate, by a preponderance of the evidence, that PECO is responsible or accountable *for the problem described in the Complaint*" – and each of these Complainants alleged in their respective Complaint that PECO's AMI would cause, contribute to, or exacerbate their specific health conditions. (Murphy: Second Amended Complaint, ¶¶ 13 and 14: "Exposure to certain bursts of low level EMF radiation is known to *exacerbate* certain medical conditions, including the rare ailments suffered by the Complainant;" "Wireless smart meters, such as the AMR meter on the Murphy home and wireless AMI meter deployed by PECO, have and will continue to *cause* grievous bodily harm to Complaint" (emphasis added); Povacz: May 26, 2016 Interim Order on PECO Energy Company's Preliminary Objections, p.6. "In her written response to the Preliminary Objection, Complainant . . . contends that the PECO smart meter *causes* her adverse health effects" (emphasis added). Randall/Albrecht Complaint, ¶¶ 12 and 14: "Exposure to EMF and RF radiation is known to *exacerbate* a number of medical

conditions, including the ailments suffered by the Complainants;" "Complainants requested that PECO abstain from installing a wireless smart meter at their residence because the device *would adversely affect* the Complainants' health.") (emphasis added).

Those were the allegations made in the complaints. A hearing was granted to allow Complainants to prove those allegations and, pursuant to the *Kreider Order*, the Complainants must, by a preponderance of the evidence, prove the allegations of causation, contribution, and exacerbation made in their complaints.

Finally is should be noted that the *Kreider Order* does not speak of proving the "potential" or "possibility" of harm. The operative language from the Kreider Order is that "*the Complainant will have the burden of proof during the proceeding to demonstrate, by a preponderance of the evidence, that PECO is responsible or accountable for the problem described in the Complaint.*" The *Kreider Order* does not say that Complainants must prove that "PECO is responsible or accountable for the *possibility* that the problem described in the Complaint will actually exist," or that they must prove that "PECO is responsible for or accountable for the *potential* that such a problem may exist," or any other similar wording. That additional phrasing is being written in, *post hoc*, by the Complainants' Briefs.

By comparison, when one of the Complainants filed her amicus brief in *Kreider* arguing in favor of evidentiary hearings, she asked for a hearing because: "*Evidence of* disability and *negative health effects is crucial to the determination of whether PECO is providing unsafe service in violation of Section 1501.*" She did not argue that hearings were needed for the purpose of proving that harm is "possible" or "potential" or that she "sincerely believes" that such harm exists or that she had a suspicion that harm would occur, or whatever other non-

traditional characterization is now being sought by Complainants. Your Honor should decline the invitation to rewrite the Commission's *Kreider Order* to interpolate such language.

In support of their argument that they only must meet a low standard of proof, Complainants cite and briefly discuss three additional documents (pp. 75-77). The three documents cited by Complainants do not provide support for the proposition that Complainants only need to prove "potential" harm.

First, Complainants cite to a 2003 law review article by former Commission Chairman Terrance Fitzpatrick, and claim that it demonstrates that "the role of the Commission in adjudicative proceedings is at least in part a policymaking role, particularly when the Commission is applying broad legislative grants of authority, such as the safe and reasonable standards of section 1501."

The Fitzpatrick article relates to procedures that the Commission undertook to craft legislation and settlements during the move to competition. The article has nothing to do with standards or burdens of proof, causation, medical causation, safety, demonstration of actual vs potential harm, or the determination of reasonable utility service.

Perhaps more importantly, the article is actually a caution against allowing policy implications to enter the quasi-judicial function. Mr. Fitzpatrick states that "it is not acceptable for a commissioner to base a quasi-judicial vote solely upon policy and political considerations. It is beyond dispute that such an approach cannot be reconciled with the quasi-judicial responsibilities of a commissioner."[9]

[9] Elsewhere in the article, Commissioner Fitzpatrick underscores that whatever quasi-judicial latitude the Commissioners themselves have does not does not extend to administrative law judges, who are "required by law to have the background and experience normally required for quasi-judicial officers" – they must be lawyers, have specified levels of experience practicing before a regulatory agency, and are subject to a Code of Ethics that parallels the Code of Judicial

In sum, the Fitzpatrick article provides no support for the proposition that Your Honor or the Commission should use this quasi-judicial proceeding to implement new policy or use a standard of proof that is any less than the normal burden and standard of proof for formal complaints.

Second, Complainants cite a recent article in the publication In-House Defense Quarterly for the proposition that: "It is a generally recognized principle of administrative law that agencies like the Commission charged with ensuring safety 'do not shoulder the burden borne by plaintiffs. They use [weight of the evidence methodology] to alert the public to *possible* hazards.'" (emphasis in original article).

Again, the In-House Defense Quarterly article is actually a caution against allowing the quasi-legislative rule to be expanded into judicial proceedings. The authors specifically note that attempts to use the rulemaking-type analysis have been rejected by the Pennsylvania courts because these methods "are not scientific methodologies. They are not verifiable or replicable, but rather are based on subjective judgment." *Jacoby v Rite Aid Corp.*, 93 A. 2d 503 (Pa. Super. Ct. 2013), quoted in the In-House Defense Quarterly article. The authors conclude by robustly rejecting the idea that the rules of the quasi-legislative rulemaking function have any role in the judicial setting:

> No expert should be permitted to [testify based] on the mere assertion that regulators have used the same methodology. If the expert is following the regulatory methodology, the expert must explain why that regulatory framework is adequate to determine legal causation under a more likely than not standard. Which regulatory agencies use the expert's version of [weight of the evidence]? What are the goals of the regulatory analysis where the method has been used? Has the method been used outside of the

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Conduct. In Mr. Fitzpatrick's view, administrative law judges therefore do not have the same latitude as Commissioners to purposefully create new policy through their quasi-judicial decisions. Mr. Fitzpatrick succinctly describes the "fundamental quality that distinguishes a judge from a policymaker" as "the commitment to follow the law even when doing so is unpopular."

regulatory context in litigation? Would the expert reach the same result if Bradford Hill were applied?

An expert without a justifiable basis for using [weight of the evidence] over a universally accepted scientific methodology is using regulatory agency methods as a smokescreen for his or her 'say so.'

As with the Fitzpatrick article, the In-House Defense Quarterly article thus undercuts, rather than supports, Complainants' claim that this proceeding should use an alternative standard of proof drawn from the quasi-legislative functions of the Commission.

The third and final citation that Complainants use to support their argument for a lower standard of proof is *Allen v Pennsylvania Engineering Corp.*, 102 F. 3d 194 (5th Cir. 1996).[10]

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[10] Complainants' Main Brief inadvertently provided an incorrect citation for the materials quoted in text, attributing the quotation to *Wright v Willamette Industries, Inc.*, 91 F. 3d 1105 (8th Cir. 1996). With that said, *Wright v Willamette* does contain an interesting discussion of the difference between the role of the legislature and the role of the courts in setting risk avoidance policy on scientific issues. As applied to the instant proceeding, *Wright* makes it clear that, by seeking a lower standard for action, Complainants are asking Your Honor and the Commission to act in a legislative capacity. That is not appropriate in a quasi-judicial proceeding. The *Wright* court drew the distinction as follows:

> *A legislature might well altogether outlaw a substance on the ground that it is known to involve a risk of appreciable harm to human beings, without having precise data* on the question of how much harm, or what kind of harm, some specific amount of that substance might reasonably be expected to cause to some particular kinds of persons or even to an average or an ordinary person. Such legislation would presumably, as an ordinary matter, survive judicial scrutiny as a rational exercise of the police power. Indeed, the lack of precise information about the extent of a risk might well be seen as bolstering the legitimacy of a legislative prohibition rather than undermining it. . . . *Whatever may be the considerations that ought to guide a legislature in its determination of what the general good requires, courts and juries, in deciding cases, traditionally make more particularized inquiries into matters of cause and effect.* . . . It is therefore not enough for a plaintiff to show that a certain chemical agent sometimes causes the kind of harm that he or she is complaining of. At a minimum, we think that there must be evidence from which the factfinder can conclude that the plaintiff was exposed to levels of that agent that are known to cause the kind of harm that the plaintiff claims to have suffered. We do not require a mathematically precise table equating levels of exposure with levels of harm, but *there must be evidence from which a reasonable person could*

Complainants take the position that a regulatory agency, when acting in a quasi-legislative capacity, has a role that is "very different from the role of a court in a lawsuit for damages." The Complainants' Main Briefs quotes *Kelly* on that point:

> We are also unpersuaded that the "weight of the evidence" methodology these experts use is scientifically acceptable for demonstrating a medical link between Allen's EtO exposure and brain cancer. Regulatory and advisory bodies such as IARC, OSHA and EPA utilize a "weight of the evidence" method to assess the carcinogenicity of various substances in human beings and suggest or make prophylactic rules governing human exposure. This methodology results from the preventive perspective that the agencies adopt in order to reduce public exposure to harmful substances. *The agencies' threshold of proof is reasonably lower than that appropriate in tort law; which traditionally makes more particularized inquiries into cause and effect and requires a plaintiff to prove that it is more likely than not that another individual has caused him or her harm.*(italicized emphasis in Complainant's Main Briefs).

The full context of that quote is critical. In Complainants' Main Briefs, *they left out the language that PECO has underlined above*, which establishes quite clearly that the *Kelly* court was not supporting the use of the quasi-legislative "weight of the evidence" rule in a judicial proceeding, but was *rejecting it because the methodology is not scientific acceptable.* When Complainants ask Your Honor and the Commission and the Commission to use a lower standard of proof based on the quasi-legislative model, they are asking you to adopt a methodology that has been rejected for use in judicial settings because it is not scientifically acceptable.

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conclude that a defendant's emission has probably caused a particular plaintiff the kind of harm of which he or she complains. . . (internal citations omitted; emphasis added)

II. The Complainants did not meet their burden of proving, by a preponderance of the evidence, that PECO's AMI meter will cause, contribute to, or exacerbate their adverse health conditions

At hearing, two of the Complainants – Laura Sunstein Murphy and Maria Povacz – offered the testimony of Dr. Martin Pall. In their Main Briefs, however, they do not discuss the testimony of Dr. Pall, stating (p. 27, fn 1) that they "will lighten the burden of evidentiary review on the Commission and otherwise simplify the issues by not calling attention to the voluminous testimony of Dr. Pall."

PECO appreciates this gracious offer, and in return it will not call attention to the intensive cross-examination of Dr. Pall, nor to the voluminous testimony offered by PECO that directly addresses and disproves statements made in Dr. Pall's testimony.

If for any reason the Complainants later change their approach and decide that they should bring attention to the testimony of Dr. Pall, PECO reserves the right to respond to such arguments if and when made.

A. Dr. Marino's overall opinions, even if accepted as true, do not meet the Complainant's burden of proof

Complainants' Main Briefs note (p. 28) that Dr. Marino offered two overall opinions in this proceeding: "(1) that there is a basis in established science to conclude that the Complainants could be exposed to harm from the radiation emitted by PECO AMI or AMR smart meters, and (2) because the PECO smart meters have not been proved safe it is unreasonable to force the Complainants to accept the exposure to the radiation emitted by the smart meters on their residences."

On closer examination, neither of these opinions, even if accepted as true, meets the Complainants' standard and burden of proof in this proceeding.

With respect to the first opinion, expressed in Complainant's Main Brief as "Complainants could be exposed to harm," it should be noted that Dr. Marino actually testified that there is a basis in established science that the Complainants would be "exposed to danger," not "exposed to harm." September 15, 2016 Transcript at 578. This not a trivial difference. Elsewhere in Dr. Marino's testimony, he repeatedly used "risk" and "danger" as synonyms. Indeed, he testified that his definition of "health risks" is "actual or potential danger to human health from manmade electromagnetic energy." September 15, 2016 Transcript at 671.[11] Therefore, whenever Dr. Marino discussed health "risks" or "dangers," his testimony included the "potential" that the AMI meters would cause harm.

This is not a hypothetical difference, and it goes directly to whether Complainants met their burden of proof. On direct testimony, September 15, 2016 Transcript at 643-44, Dr. Marino was directly asked to distinguish whether his opinion is that exposure to radiofrequency fields from PECO's AMI meters "could" – that is, has the potential to – cause harm to Complainants or that exposure "would" – that is, actually – cause harm to Complainants. He was absolutely clear that he was speaking only about the potential "could," not the actual "would":

> Q. Now, do you have an opinion about whether electromagnetic energy from Smart Meters could cause the symptoms that were reported by Maria [Povacz] and Laura [Murphy]?

[11] There was some discussion as to whether Dr. Marino actually defined "health risk" as "a factor or condition that is *reasonably suspected* of actually or potentially contributing to the development of human disease or disorder," and Dr. Marino ultimately testified that he accepts that definition, that it is "pretty synonymous" with "actual or potential danger," and that he adopts both definitions. September 15, 2016 Transcript at 671-73. Of course, testifying that something is "reasonably suspected" of contributing to human disease is even further way form meeting the standard in this proceeding of demonstrating, by a preponderance of the evidence, that the agent will cause, contribute to, or exacerbate the disease.

A. Yes.

Q. What is that opinion?

A. It could happen. It could be responsible. It could be a causal relationship. The evidence I think is clear about that. It could.

Q. Do you have an opinion about whether it did cause those symptoms?

A. I have an opinion that I can't say whether it did or not. That's my opinion about "did."

Q. Okay. So why -- why -- what is the basis for that?

A. Well because in order to answer that, we would have to do a $500,000 study. That's the only way you can normalize a cause and effect relationship in a given human being. You got to bring them in and do an experiment.

Q. You're talking about with respect to electromagnetic energy?

A. Yes.

Q. Now, do you have an opinion about whether electromagnetic energy from Smart Meters could cause harm to the health of Cynthia Randall?

A. Yes.

Q. What is that opinion?

A. It could.

Q. Are you saying it will cause harm to her health?

A. No.

Q. And why are you not saying that it will cause harm to her health?

A. Because I have no basis to say that.

Q. Why not?

A. Why not? Why don't I have a basis? I just don't have it. There's no evidence that could warrant that statement.

Thus, taken at face value and accepted as true, Dr. Marino's testimony does not establish that exposure to PECO's AMI meters will cause, contribute to, or exacerbate any of Complainants' health conditions. His testimony does not meet the burden and standard of proof in this proceeding.[12]

Dr. Marino's second opinion – that "because the PECO smart meters have not been proved safe it is unreasonable to force the Complainants to accept the exposure" to PECO's AMI meters – is even more problematic because here, he is simply arguing that the Commission should act upon the lower evidentiary standard proposed by Complainants. In fact, in his direct testimony, September 15, 2016 Transcript at 636, Dr. Marino candidly admitted that that this issue is not a "purely scientific" opinion, stating that, upon viewing the research data, "you can see that different minds may make different associations. Certain minds may require – certain minds may accept a level very high. Others not so high. Others may be too low. All depending on their attitude. . . That's why it's not a purely scientific question and never can be. Anybody who styles it that way isn't thinking right."

As this is not a "purely scientific" issue, there is no reason to give any particular weight or deference to Dr. Marino's opinion on it. Indeed, in the context of this litigation, there is a significant reason to devalue Dr. Marino's opinion on this issue, because his position reverses the burden of proof completely – according to Dr. Marino, PECO must prove that the AMI meters are safe, and if it has not done so then it is "unreasonable" to deploy them to the Complainants'

[12] In Section VI of their Main Briefs, Complainants argue that forced exposure to PECO's AMI meters would violate their due process rights. In Section VII or their Main Briefs, Complainants argue that they have met their burden of proving that PECO's AMI meters has adversely affected them and that installation of a meter will thus violate Section 1501 of the Pennsylvania Public Utility Code. Both of those arguments are based upon the lowered standard of proof that Complainants' proffer in this proceeding. Both arguments fail when viewed against the correct standard and burden, given Dr. Marino's testimony that "there is no evidence that would warrant the statement" that PECO's AMI meters will harm the Complainants.

homes. That is the same as claiming that PECO has the burden of proof in this proceeding. That is not the standard used by the Commission in complaint proceedings. Moreover, the fact that Dr. Marino's testimony used a framework that is simply based upon his personal attitude towards risk provides further basis to disregard his testimony on what must be proven with respect to risk.

B. Dr. Marino's testimony regarding background EE

In this section of Complainants' Main Briefs, they recount Dr. Marino's view that, unless PECO's AMI meters produce radio frequency fields of a greater magnitude than background or ambient field levels, he does not believe that they could produce biological or health effects. However, Dr. Marino testified that he believes that the AMI meters do produce fields that are higher than ambient.

There are two reasons that this testimony should be doubted. First, Dr. Marino did not do any measurements or calculations of background or ambient fields at the Complainants' residences or places of work. He simply accepted the representations of Complainants' counsel that they had made efforts to reduce fields at their homes, and he thus assumed that the fields would be similar to "quiet homes" at which he has made measurements in the past. *See, for example*, September 15, 2016 Transcript, pp. 582-84, 687, 692-93. He thus has no data or baseline for the ambient levels at the Complainants' households upon which to base his comparison – only what counsel told him to assume.

Second, Dr. Davis testified that people's exposure to fields from everyday sources, including nearby UHF radio stations, is much higher the fields from PECO's AMI meters.

Murphy Rebuttal Testimony of Christopher Davis at 17; Povacz Rebuttal Testimony of Christopher Davis at 17-18; PECO Exh. CD-5 and CD-6.

Dr. Marino attacked Dr. Davis's testimony on the grounds that his comparison was of average exposures, whereas Dr. Marino believes that "peak" exposures are the only exposures of interest. There are two answers to this position. First, the Federal Communications Commission, which is the federal agency tasked with regulating safety and health concerns for radio frequency transmissions from smart meters, calculates exposure as average exposure over time. Murphy Rebuttal Testimony of Christopher Davis at 13; Povacz Rebuttal Testimony of Christopher Davis at 13-14. When Dr. Davis used averages, he was thus utilizing the approach used by the regulator who oversees health and safety in this area. Second, Dr. Davis also compared the peak emissions from the AMI meters to the continuous, ongoing levels of radio frequency fields from nearby UHF stations. He calculated that, at the Murphy residence at a distance of 85 feet from the AMI meter, the peak exposure to AMI fields would be the same as the average, continuous exposure that the Murphy residence receives from local UHF stations. December 8, 2016 Transcript at 1425-26. As to the Randall/Albrecht residence, Dr. Davis determined that it is located near an antenna farm. December 7, 2016 Transcript at 1246. Because of that proximity, at their home the Randall/Albrecht's have a steady-state exposure to radio frequency fields from this single source – UHF towers – of 10 microwatts per centimeter squared. December 7, 2016 Transcript at 1252. The peak exposure from the AMI meter, one meter away from the AMI meter while it is transmitting, is 16 microwatts per square centimeter. Id. Given that the Randall/Albrecht home is continuously exposed to a 10 microwatt field from this single source, Dr. Marino's conclusions that the Complainants live in electrically "quiet" homes should be seen as very suspect.

C. Dr. Marino's testimony regarding pulsing

In this section of Complainants' Main Briefs, they discuss Dr. Marino's testimony that PECO's AMI meters produce "pulses."

In Dr. Marino's use of the word "pulse," he means any source that is turned on and then sometime later is turned off. September 15, 2016 Transcript at 590.

Dr. Davis provided the following discussion of "pulses" in which he explains that this is the layperson's use of "pulse," but it is not the characterization used by communications physicists and engineers:

> First, as to the term "pulsed," it depends on how and for what purpose one is using the term and how technically accurate one wants to be. In layman terms, "pulsed" can be used to describe anything that differs in a rhythmic way. In that sense, a device that turns on a lamp each night for a few hours is producing a "pulsed" visible light frequency electromagnetic field.
>
> Second, in communications physics and engineering, "pulsed" means using 1.amplitude modulation and 2. doing so in a way that produces a signal that has abrupt changes in the amplitude of the sine wave. PECO's AMI meter radios are not amplitude modulated so they do not produce "pulsed" fields. PECO's AMI meter radios are frequency modulated, specifically "frequency shift keyed," and send out a collection of regular non-pulsed sine waves around the frequencies they use. (AM radio station signals are 1. amplitude modulated, which is what "AM." stands for, but 2. they transmit a sine wave whose frequency is fixed, the so-called "carrier frequency." The amplitude of that sine wave is modulated up and down in a continuous way to encode the voice or music being transmitted. That is why communications physicists and engineers do not refer to radio station signals as "pulsed" signals.)
>
> In sum, the fields from PECO's AMI meters are not amplitude modulated and thus are not "pulsed" and therefore do not create "pulsed" fields. If [one] is using the term "pulsed" to suggest that during the time PECO AMIs transmit, they are sending pulses of radio frequency energy then he is incorrect.

Murphy Rebuttal Testimony of Christopher Davis at 21-22; Povacz Rebuttal Testimony of Christopher Davis at 21-23

D. Dr. Marino's testimony regarding peak v instantaneous values

PECO addresses Dr. Marino's testimony on peak vs average values in the section related to electromagnetic energy in the background.

E. The bases for Dr. Marino's first opinion

This section of Complainants' Main Briefs discusses the bases for Dr. Marino's opinions, as derived from experimental, epidemiological, and mechanism studies, as well as Dr. Marino's published study of electro-hypersensitivity, or "EHS."

Given the fact that Dr. Marino's ultimate opinions do not meet the standard or burden of proof in this proceeding, there is little value in addressing each the individual studies upon which he relied in forming that opinion. However, there are a few issues that should be highlighted because they call into question whether even his expressed opinion should be accepted as stated, and certainly call into question whether his opinion should be the basis of Commission action.

The first is Dr. Marino's EHS study. He candidly testified that, prior to his study, there were no published studies that any person is able to detect the presence of absence of electromagnetic energy. (He thinks all of the studies other than his were poorly designed. September 15, 2016 Transcript, p. 614.) His study involved one (1) subject. September 15, 2016 Transcript, p. 609. He further testified that, even taking into consideration his own study, his opinion is that the AMI meters have the potential to "trigger EHS, not cause it, trigger it," but that "I believe my speculation is that's the case, but I don't have direct evidence to say that." September 17, 2016 Transcript, p. 779. And yet he still thinks that his testimony provides an evidentiary basis to remove the AMI meters from the Complainants' residences. This is simply not a reasonable approach.

The second issue is Dr. Marino's view of "negative" studies. In scientific research, sometimes the investigator finds that exposure to the agent of interest results in a change in a measured endpoint (a "positive" study); sometimes the investigator finds that exposure does not result in change to a measured endpoint (a "negative" study). Dr. Israel testified that it is not scientifically valid to ignore negative studies, and it is very important to consider negative studies in determining whether a reported effect is reproducible. He stated that the practice of ignoring negative studies is not a generally accepted scientific practice, and that scientists routinely consider negative studies in making their evaluations. December 8, 2016 Transcript at 1552-53. Dr. Marino took a dramatically contrasting view, stating that a negative study has "no probative value" and that "in the whole history of science, I can only think of one study and that was done in the late 1880s where a negative study had meaning." Consequently, Dr. Marino gave no weight whatsoever to any published research in which the investigator sought, but was not successful, at showing that exposure to radiofrequency fields caused a change in a measured endpoint. Of course, this analytic approach will result in vary stilted view of the body of research that skews towards only seeing positive studies and thus will lead the reviewer to artificially conclude that effects may exist, even if many negative studies have been done that failed to reproduce or replicate such an outcome. And that is what Dr. Marino bases his opinion on.

The third and final issue is that, according to Dr. Marino, there is a body of individuals who are "bonded to industry," by which Dr. Marino means "they were consultants to industry or had some financial relationship or at a minimum an undisclosed conflict of interest with regard to industry. That was summed up in the term bonded." September 16, 2016 Transcript, p. 835. The problematic part of Dr. Marino's belief about "bonded" individuals goes beyond his mere

belief in the existence of bonded persons. The problem is that Dr. Marino will conclude that a person is "bonded" without any evidence of financial ties based solely on the position taken by that person – if they do not support the view that electromagnetic energy has a non-thermal effect, then Dr. Marino assumes that they are "bonded to industry" by financial payments. September 16, 2016 Transcript, pp. 858-59:

> There are two groups that are bonded and nonbonded the way I've defined them, and those two groups are groups that have opinions regarding whether nonthermal effects exist and constitute potential health risks: the bonded associated with industry and say no problems; the nonbonded or not associated with industry and say problems.
>
> * * *
>
> Not everybody who envelopes the thermal standard is bonded to industry. *It's just that all people deny the nonthermal standard are bonded to industry in my experience.*

That is more than just an unfortunately jaded view. It means that, whenever a person or organization disagrees with Dr. Marino as to whether non-thermal effects exist, he does not grapple with the substance of their opinion – he simply concludes that they are "bonded to industry" and dismisses their opinion outright. Notably, Dr. Marino placed the European Commission's Scientific Committee on Emerging and Newly Identified Health Risks, September 15, 2016 Transcript, p. 837-841, and an arm of the World Health Organization, id. p. 849, into the "bonded to industry" category – by which he means that he concludes, without further evidence, that they are being paid by industry because they disagree with him. Testimony based on such an approach cannot and should not be the basis of a Commission determination.

F. Dr. Marino's testimony on health risks

This section of the Complainants' Main Briefs was addressed previously, in the discussion of Dr. Marino's overall opinions.

G. Dr. Marino's testimony regarding the effect on Complainants

This section of the Complainants' Main Briefs sets forth Dr. Marino's testimony that PECO's AMI meters "could" harm the Complainants (without mentioning that Dr. Marino specifically declined to testify that the PECO AMI metes "would" harm the Complainants). PECO previously addressed this testimony in the discussion of Dr. Marino's overall opinions, and will not repeat that discussion here.

However, there is one additional point that should be highlighted from Dr. Marino's testimony. This section of the Complainants' Main Brief begins with the statement that: "Laura Sunstein Murphy and Maria Povacz both self-report as EHS, a diagnosis that has been confirmed by their physicians."

Dr. Marino testified that "a person's subjective self-diagnosis of electromagnetic hypersensitivity is not sufficient to establish to establish that the person has electromagnetic hypersensitivity." September 16, 2016 Transcript, p. 787. No weight should thus be given to the Complainants' self-diagnosis that they have EHS. And for the witnesses who claimed to have EHS, both of the treating physicians testified that they did no independent diagnostic tests to confirm the self-diagnosis of EHS. (Murphy/Prociuk: "[D]iagnostic testing . . . has not been established with EMF sensitivity, to my best understanding." December 5, 2016 Transcript at 83; Povacz/Talmor, June 7, 2016 Transcript at 105.) Thus, the only testimony that these Complainants even have EHS is based upon information that, according to Dr. Marino, is "not sufficient to establish that the person has" EHS.

H. Dr. Marino's testimony on the role of physicians

In this section, Complainants' Main Briefs discuss what Dr. Marino sees as some of the limitations on the role of treating physicians with respect to EHS and other claimed health effects – primarily that they do not make judgments about causation, and there is no consensus clinical diagnosis or diagnostic algorithm for EHS.

Complainants did not discuss the testimony of their treating physicians at any length, but it should be noted that the testimony of the treating physicians also did not meet Complainants' burden of proof in this proceeding.

Dr. Prociuk (Murphy) testified that "with respect to this syndrome of electromagnetic sensitivity, we're in this sort of clinical stage of infancy. . . . So when I say yes, there could be a connection, I am very mindful of the fact that the clinical science is not well established." December 5, 2016 Transcript at 82.

Dr. Honebrink (Randall) was asked: "In your opinion, has it been scientifically demonstrated that RF [radio frequency] fields from the PECO AMI meter can cause cancer?" She responded: "I really don't have an opinion on that because I have not studied the PECO fields." She was further asked: "In your opinion, has it been scientifically demonstrated that RF [radio frequency] fields from the PECO AMI meter can exacerbate cancer?" She answered: "Again, that is not something I have specifically studied." September 27, 2016 Transcript at 29.

Dr. Talmor (Povacz) testified that the body is like a computer hard drive that stores information received from radio frequencies in the water between cells, and that manmade sources of radio frequency fields puts misinformation in the body. June 7, 2016 Transcript at 94-

95. He accepted Ms. Povacz's self-diagnosis of EHS without doing additional diagnostic tests. Id. at 105.

Collectively, this testimony from the treating physicians does not support the Complainants' burden of proving that they were or will be harmed by PECO's smart meters.

I. Dr. Marino's testimony that there have been no studies on smart meter safety

This section of Complainants' Main Brief is comprised of a single sentence: "There are no studies on the safety of smart meters."

No argument was made on the basis of this statement. PECO notes, however, that if this statement is true, then it is also perforce true that there are no studies on the "unsafety" of smart meters. This statement thus provides additional support for the view that Complainants did not meet their burden of proof.

J. Dr. Marino's testimony on FCC limits

This section of Complainants' Main Briefs recounts Dr. Marino's testimony on the FCC standards. It is presumably offered to support Dr. Marino's view that the FCC standards are outdated and do not properly reflect more recent research on non-thermal effects. PECO's responsive testimony on this issue is set forth in the section on Dr. Davis' testimony.

K. Dr. Marino's testimony on the reports of various organizations

This section of the Complainants' Main Brief explains why Dr. Marino does not rely upon the opinions of organizations who disagree with him. PECO notes that Dr. Marino's later testimony elaborated on his reasons for not relying upon such organizations – if they disagree with his views on non-thermal effects, then he concludes on that basis alone that they are

"bonded to industry" and gives no weight to their work. As PECO explained in the section related to the "Basis for Dr. Marino's first opinion," that is actually a reason to disbelieve Dr. Marino's conclusions.

L. Dr. Marino's testimony about the World Health Organization

This section of Complainants' Main Brief recounts Dr. Marino's complaint that he tried to contact the World Health Organization to discuss the WHO reports on radio frequency fields, but WHO representatives will not return his calls. PECO has no response to that testimony.

This section also notes that the International Agency for Research on Cancer ("IARC") has classified electromagnetic energy as a "possible" carcinogen. Dr. Israel provided context for understanding that classification:

> IARC said that there was limited evidence that radio frequency fields could contribute to cancer and there was limited evidence in animals and those criteria that there's not sufficient evidence to identify it as a probable cause, because there's limited evidence in humans and limited evidence in animals, it gets designated as a category 2B which stands for "possible." I've always been uncomfortable with "possible" because "possible" to me is misleading to the population that I have to take care of because I think what IARC means is that there's limited evidence in humans and limited evidence in animals. "Possible" in the lay language of the people I have to take care of, means my God it might be possible or oh, well anything is possible, so I should pay attention to this. So I really always focus when I talk to people about the fact they're just isn't evidence to identify this as even a probable carcinogen.

December 9, 2016 Transcript at1630-31.

M. The basis for Dr. Marino's second opinion

This section of the Complainants' Main Briefs was addressed previously, in the discussion of Dr. Marino's overall opinions.

III. The claim that Dr. Marino is uniquely qualified

In this Section of their Main Briefs, Complainants recount Dr. Marino's background. In the heading of the argument they claim that this background "uniquely" qualifies him to testify, but give no analysis or argument in text as to why his background makes him uniquely qualified.

PECO accepted the proffer of Dr. Marino as an expert without objection or *voir dire*, September 15, 2016 Transcript at 576, and it continues to accept that Dr. Marino has sufficient background and training to meet the definition of an expert.[13] But PECO sees nothing in those qualifications that makes him "uniquely" qualified to testify in this proceeding.

IV. Arguments that "PECO's response to Dr. Marino is wrong"

In this section of their Main Briefs, Complainants set forth arguments that they believe PECO made in testimony or will make in Brief with respect to Dr. Marino's testimony, and pre-emptively claim that those arguments are wrong.

A. The claim that Dr. Davis uses an averaging "trick"

This section deals with the comparison of average and peak emission values. PECO responded to this issue in Section II.B., related to electromagnetic energy in the background.

PECO adds that it is somewhat misleading to refer to use of averages as a "trick" when that is the method prescribed by the Federal Communications Commission for use in determining compliance with its safety regulations. Murphy Rebuttal Testimony of Christopher Davis at 13; Povacz Rebuttal Testimony of Christopher Davis at 13-14.

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[13] Pennsylvania Rule of Evidence 702: "A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if . . . the expert's scientific, technical, or other specialized knowledge is beyond that possessed by the average layperson."

B. The claim that "PECO Offered No Substantive Response to the Heart of Dr. Marino's Testimony

PECO provided a substantial, persuasive response to Dr. Marino's testimony, which is set forth in the later section of this Brief in which PECO sets forth its affirmative evidence.

C. The claim that "Dr. Israel's Testimony Based Exclusively on Negative Studies is Irrelevant"

Dr. Israel's testimony was not based exclusively on negative studies. He testified to the methodology that he used, and he explicitly stated that: "For each [symptom or condition], I considered the studies that (1) report an effect and (2) studies that report no effect because that is necessary for a reliable medical evaluation." Murphy Rebuttal Testimony of Mark Israel at 3-5; Povacz Rebuttal Testimony of Mark Israel at 3-5.

In fact, it is Dr. Marino whose analysis is flawed, because he refuses to consider the results of a "negative" study as having any importance. PECO discussed this issue in greater detail in section II.B. (The bases for Dr. Marino's first opinion.)

D. The claim that Dr. Davis mischaracterized the scientific consensus

In this proceeding, each of the expert witnesses claimed at various times that their opinion represents the scientific consensus.

The argument presented in this portion of the Complainant's Main Briefs is essentially a variation on the theme that certain groups are "bonded to industry," which PECO responded to in Section II.E. Essentially, Dr. Marino believes that certain groups are bonded to industry and should be ignored. Dr. Marino believes that the only valid scientific stakeholders whose views should be considered in determining the scientific consensus are scientists outside of the

"bonded" group – that is, people who agree with him on non-thermal effects. It is not surprising that Dr. Marino, having surrounded himself solely with like-minded people, finds that they all think the same way he does. But that does not constitute a consensus scientific view.

Drs. Davis and Israel, on the other hand, do not automatically dismiss the views of those who believe differently than they. For example, Dr. Israel reviews both positive and negative studies, and also reviews the findings of public health groups to determine whether they provide any insights that he missed and to see if they reached conclusions that are inconsistent with his initial determinations. Murphy Rebuttal Testimony of Mark Israel at 3-5; Povacz Rebuttal Testimony of Mark Israel at 3-5.

The proof of this issue is in the pudding. Dr. Marino's "consensus" excludes the Federal Communication Commission, the International Commission on Non-Ionizing Radiation Protection, European Commission's Scientific Committee on Emerging and Newly Identified Health Risks, September 15, 2016 Transcript, p. 837-841, an arm of the World Health Organization, id. p. 849, and potentially many other federal agencies. September 15, 2016 Transcript, p. 834. His opinions do not represent the scientific consensus, other than the consensus of a group of like-minded individuals to whom he is willing to listen because they agree with him and thus are not, by his definition, "bonded to industry."

E. Doctor Marino's EHS Study

PECO addressed Dr. Marino's EHS study in Section II.B. (The bases for Dr. Marino's first opinion.)

F. The claim that "PECO's Experts hold Complainants to an Unreasonably High Burden of Proof"

This argument is addressed in Section I, regarding burden and standard of proof.

G. The claim that PECO should not have relied on the reports of public health agencies

This argument is based upon Dr. Marino's view that any entity that disagrees with him on non-thermal effects is definitionally "bonded" to industry, and thus should not be relied upon. PECO addressed that claim in Section II.E. (The bases for Dr. Marino's first opinion.)

This section also contains a footnote in which Complainants claim that PECO "violated the hearsay rule by the citations and quotations of the various reports," citing *Majdic v Cincinnati Machine Company*, 537 A. 2d 334 (Pa. Super 1988).

Twelve years after the Superior Court issued the *Majdic* ruling, the Pennsylvania Supreme Court issued its Opinion in *Aldridge v Edmonds*, 750 A.2d 292 (Pa. Supreme 2000), in which the Court described the allowable uses of learned treatises in expert testimony:

> There is no question that if published material is authoritative and relied upon by experts in the field, although it is hearsay, an expert may rely upon it in forming his opinion; indeed, it would be unreasonable to suppose that an expert's opinion would not in some way depend upon the body of works preceding it. Pennsylvania courts have thus permitted, subject to appropriate restraint by the trial court, limited identification of textual materials (and in some circumstances their contents) on direct examination to permit an expert witness to fairly explain the basis for his reasoning. *See* P.R.E. 705 (providing that "[t]he expert may testify in terms of opinion or inference and give reasons therefor"); *see also In re C.R.S.*, 696 A.2d 840, 845 n. 7 (Pa.Super.1997)(suggesting that experts may refer to published works serving as the basis for their opinions). *See generally Cummings v. Borough of Nazareth*, 430 Pa. 255, 265, 242 A.2d 460, 466 (1968) (plurality opinion) (stating that "[i]t is entirely proper in examination and cross-examination for counsel to call the witness's attention to published works on the matter which is the subject of the witness's testimony").

> Since, however, the purpose for which treatises may be referenced on direct examination is generally limited to explaining the reasons underlying the opinion, the trial court should exercise careful control over their use to prevent them from being made the focus of the examination. Additionally, the trial court should issue appropriate limiting instructions. *See generally* Pa.R.E. 105 ("[w]hen evidence which is admissible as to one party or for one purpose but not admissible as to another party or for another purpose is admitted, the court upon request shall, or on its own initiative may, restrict the evidence to its proper scope and instruct the jury accordingly").

Dr. Israel testified that he first forms a preliminary opinion based on research and analysis of primary research, then he reviews the reports of public health agencies and similar organizations to see if they provide any insights Dr. Israel missed and to see if their conclusions are inconsistent with Dr. Israel's initial determinations. He then makes his final medical evaluation. Murphy Rebuttal Testimony of Mark Israel at 7; Povacz Rebuttal Testimony of Mark Israel at 6-7. He is allowed to do that. Indeed, as the *Aldridge* court noted, experts are allowed to rely on hearsay in forming their opinion because "it would be unreasonable to suppose that an expert's opinion would not in some way depend upon the body of works preceding it." And, as *Aldridge* allows, he then identified the reports, and made reference to their ultimate findings, "to fairly explain the basis for his reasoning." PECO did not offer the documents at hearing or in its Brief for the truth of the matters asserted therein. Its use of these reports is proper under *Aldridge*.

PECO recognizes that, if this was a jury trial, Your Honor would issue limiting instructions to the jury not to accept the findings of the report as evidence of truth of the matters asserted therein. But PECO is confident that Your Honor can walk that path alone. PECO's activities comply with *Aldridge*.

H. The draft National Toxicological Program Report

This section correctly notes that the National Toxicological Program issued an unpublished, draft in May 2016. Complainants also correctly note that there is "stark disagreement" amongst the experts as to what weight, if any, to give to this draft report. Dr. Marino believes that the draft, unpublished report should be given a great deal of weight because he is convinced that it was a well-done study. Dr. Davis takes the view that one should wait for the review and publication process to be completed before deciding how much weight to give to the study; in the interim, he gives it little or no weight.

This is a draft, unpublished report. Once it is finalized and published, the results will need to be analyzed and integrated in the context of all other existing research on radio frequency exposure and cancer endpoints. Only then will we know what weight to give this research. Until then, PECO respectfully suggests that the Commission should treat the NTP report as what everyone knows and admits it is: a draft, unpublished report.

I. The claim that the FCC limits are outdated and insufficiently protective and outdated

PECO's responsive argument on this issue is set forth in the section on Dr. Davis' testimony.

V. PECO presented substantial, persuasive expert testimony that demonstrates that its AMI meters will not cause, contribute to, or exacerbate adverse health effects in Complainants

As noted above, Complainants have the burden of proof. When the limited testimony of Complainants is viewed in the context of the evidence adduced by PECO, it is absolutely clear that Complainants failed to demonstrate, by a preponderance of the evidence, that PECO's AMI meter will cause, contribute to, or exacerbate any adverse health effects.

On these issues, PECO sponsored the testimony of two eminent scientists – Dr. Christopher Davis, and Dr. Mark Israel – and of a PECO engineer with expertise in the design and operation of the advanced meter system, Mr. Glenn Pritchard.

A. Dr. Christopher Davis is a physicist and engineer and is an expert in physics, biophysics, electrical engineering, electromagnetics and radio frequency exposure and dosimetry

Dr. Christopher Davis is a Professor of Electrical and Computer Engineering at the University of Maryland. He has a PhD in physics from the University of Manchester (England). He regularly teaches electromagnetics, including issues to do with radiofrequency waves. He has conducted research on electromagnetics, including radio frequency phenomena and devices, and has published hundreds of papers and presentations presenting the results of his research. He has been elected as a fellow of the Institute of Electrical & Electronics Engineers ("IEEE"), and as a fellow of the Institute of Physics. In his work with IEEE, he served as a member of the Committee on Man and Radiation ("COMAR"), and was chair of the COMAR subcommittee on radio frequency fields. He regularly acts as a peer reviewer for journals on issues related to electromagnetics. He has served as a consultant on radiofrequency fields to the United States Institutes of Health, the U.S. Food and Drug Administration, and United Kingdom Health

Protection Agency. Murphy Rebuttal Testimony of Christopher Davis at 1-7; Povacz Rebuttal Testimony of Christopher Davis at 1-7.[14]

1. Dr. Davis demonstrated that the radiofrequency fields from PECO's AMI technology are well below the radiofrequency exposure guidelines of the U.S. Federal Communications Commission and the International Commission on Non-Ionizing Radiation Protection

Dr. Davis testified that the Federal Communications Commission ("FCC") has established a "Maximum Permissible Exposure," or "MPE," for radiofrequency fields from AMI meters. The limit is 0.6 mW/cm^2, or "milliwatts per square centimeter." The FCC standard was set on the following basis: there is one generally accepted mechanism by which radiofrequency fields can cause harm to humans – by being high enough to heat tissues. The FCC determined the lowest level of radiofrequency exposure at which animals have been observed to detect that they are feeling a little bit warm in a radiofrequency field. The FCC then set the radiofrequency exposure standard at a level 50 times below that thermal threshold. In establishing and maintaining these standards, the FCC consults closely with the Food and Drug Administration, the Occupational Safety and Health Administration, and the National Institutes of Occupational Safety and Health. Murphy Rebuttal Testimony of Christopher Davis at 13; Povacz Rebuttal Testimony of Christopher Davis at 13-14.

In setting its standards, the FCC considered claims of both thermal and non-thermal effects; it set the standards to avoid thermal effects because the scientific studies did not show any non-thermal effects. The FCC continues to consider whether there are adverse biological

[14] In their Main Briefs, Section IV, Complainants attack Dr. Davis's expertise by dismissively referring to him as an "electrical engineer," because they find some of his views to be extreme and uncompromising, and because Dr. Davis once gave a speech in which he expressed a view as to whether a mechanistic explanation is needed as a basis for causation which Complainants believe is inconsistent with some of his testimony. These are quibbles. Dr. Davis's training and experience make him imminently qualified to appear as an expert in this proceeding.

effects from non-thermal exposure levels, but considers the scientific evidence for such effects to be "ambiguous and unproven." Murphy Rebuttal Testimony of Christopher Davis at 14-15; Povacz Rebuttal Testimony of Christopher Davis at 14-16. The claim made by Dr. Marino that the FCC is out-of-date is thus untrue. The FCC keeps up-to-date on claims that radiofrequency fields can cause non-thermal effects. It just doesn't believe that they have been demonstrated sufficiently to warrant change to the FCC standards.

Dr. Davis testified that the average exposure from an AMI meter is many millions of times less, compared to the FCC standards. Murphy Rebuttal Testimony of Christopher Davis at 15-16; Povacz Rebuttal Testimony of Christopher Davis at 16; PECO Exh. CD-2. Even at *peak* exposure, the radiofrequency fields from an electric AMI meter are 40 times smaller than the FCC *average-exposure* standards. Murphy Rebuttal Testimony of Christopher Davis at 16; Povacz Rebuttal Testimony of Christopher Davis at 17; PECO Exh. CD-3.

Dr. Davis also testified that, internationally, the radiofrequency exposure guidelines are set at levels somewhat lower than the FCC Maximum Permissible Exposure levels. These guidelines were issued by the International Committee on Non-Ionizing Radiation Protection, or "ICNIRP." Dr. Davis testified that radiofrequency exposure from an average PECO AMI technology are millions of times smaller than allowed under the international standards. Murphy Rebuttal Testimony of Christopher Davis at 16-17; Povacz Rebuttal Testimony of Christopher Davis at 17; PECO Exh. CD-4.

2. Dr. Davis demonstrated that PECO's legacy AMR meters, which have been in place since the early 2000s, have radiofrequency fields that are substantially higher than AMI meters

PECO's existing meter system, which uses AMR meters, also communicates using radiofrequency transmissions. Dr. Davis compared the radiofrequency exposure from the

existing AMR meters to the radiofrequency exposure from the new AMI meters. He concluded that the AMI meter will provide 83% less radiofrequency exposure than the electric AMR meter that is currently installed at the Complainants' residences. Murphy Rebuttal Testimony of Christopher Davis at 18; Povacz Rebuttal Testimony of Christopher Davis at 18-19. PECO Exh CD-8.

3. Dr. Davis demonstrated that radiofrequency exposure from PECO's AMI technology is far less than people experience from other sources

Dr. Davis also compared the radiofrequency exposures from PECO's AMI meters to the radiofrequency exposures that people experience in their everyday life. Allowable leakage from a microwave oven ($5mW/cm^2$) are nearly 300,000 times the exposure from a PECO AMI meter. Exposure when using a cell phone is millions of times higher than from an AMI meter. Typical exposure from standing 30 feet away from someone else using a cell phone results in exposure that is 300 times greater than being simultaneously exposed to peak emissions from an electric AMI meter. Murphy Rebuttal Testimony of Christopher Davis at 17; Povacz Rebuttal Testimony of Christopher Davis at 17-18; PECO Exh. CD-5. Television broadcasters continue to broadcast using radiofrequency fields, and at Complainants' homes, the background radiofrequency fields from UHF television broadcasting are hundreds of times larger than the average exposure from an AMI meter. Murphy Rebuttal Testimony of Christopher Davis at 17; Povacz Rebuttal Testimony of Christopher Davis at 18; PECO Exh. CD-6.

Based on all of his testimony, Dr. Davis concluded, to a reasonable degree of scientific certainty, that there is no reliable scientific basis to conclude that exposure to radio frequency fields from PECO's AMI meters is capable of causing any adverse biological effects in people, including the Complainants. Murphy Rebuttal Testimony of Christopher Davis at 24-25; Povacz Rebuttal Testimony of Christopher Davis at 24-25.

B. Dr. Mark Israel is a medical doctor and is an expert in whether there is a relationship between electromagnetic fields, and particularly radiofrequency fields, and health effects.

Dr. Mark Israel is a medical doctor who was educated at Albert Einstein College of Medicine and trained at Harvard Medical School. He is licensed to practice medicine and treat patients. He has taught medical students, interns, and medical residents for more than 25 years. He has worked over the years at the National Institutes of Health (at both the National Institute of Allergy and Infectious Disease and the Molecular Genetics Section of the National Cancer Institute) and at the University of California Medical School in San Francisco. He has held positions as Professor of Genetics and Pediatrics at Dartmouth Medical School. He also has been the Director of the Dartmouth Cancer Center, teaches medical school at Dartmouth, has a research laboratory at Dartmouth, and has been the chief administrator of the cancer center. He has published more than 200 scientific papers reporting the results of his research. Dr. Israel is an elected member of the American Association for the Advancement of Science and American Society of Clinical Investigation. He has received the C. Everett Koop Medal of Courage for work in evidence-based medicine, and has been awarded the United States Public Health Service Commendation Medal. to a reasonable degree of scientific certainty, that there is no reliable scientific basis to conclude that exposure to radio frequency fields from PECO's AMI meters is capable of causing any adverse biological effects in people, including the Complainants. Murphy Rebuttal Testimony of Mark Israel at 3-5; Povacz Rebuttal Testimony of Mark Israel at 3-5.

He first became interested in studies regarding exposure to electromagnetic fields and health more than 25 years ago when, as a practicing pediatric oncologist, parents raised questions regarding exposure of their children to electromagnetic fields from power lines. He has remained

interested in, and followed, the field since that time. Murphy Rebuttal Testimony of Mark Israel at 5-6; Povacz Rebuttal Testimony of Mark Israel at 5-6.[15]

1. Dr. Israel reviewed the scientific literature on radiofrequency fields and health and concluded that there is no reliable medical basis to conclude that radiofrequency fields associated with AMI devices could cause, contribute to or aggravate any health effects

Dr. Israel conducted an evaluation of whether exposure to radiofrequency fields from PECO's AMI meters can cause, contribute to or exacerbate the conditions described by each of the Complainants. In that evaluation, he used the same methodology that he uses in the usual course of his medical work, which included searching medical and scientific databases, analyzing studies identified through that research, evaluating as a whole all of the studies that he determined were relevant to the claimed symptoms, including both studies that showed an effect and studies that did not show an effect, and review of the findings of public health agencies and organizations to see if they provided any insights Dr. Israel missed and to see if their conclusions were inconsistent with Dr. Israel's initial determinations. He then made his final medical evaluation. Murphy Rebuttal Testimony of Mark Israel at 7; Povacz Rebuttal Testimony of Mark Israel at 6-7.

Dr. Israel conducted the above-described evaluation for each of the symptoms or conditions identified by the Complainants and concluded, for each such symptom, that there is no reliable medical basis to conclude that radiofrequency fields from PECO's electric AMI

[15] In their Main Briefs, Section IV, Complainants attack Dr. Israel's expertise by noting that the laboratory that he runs has not done research on radio frequency fields, and because during the course of this hearing he resigned his position as Director of the Dartmouth Cancer Center and sued it for misapplication of charitable donations; Complainants suggest that his description of his changing job titles during this period was so disingenuous as to undercut his credibility. These are quibbles and, frankly, the argument about changing job titles is beneath counsel for Complainants. Dr. Israel's training and experience make him imminently qualified to appear as an expert in this proceeding.

meters caused, contributed to, or exacerbated, or will cause, contribute to, or exacerbate, any of the symptoms identified by Complainants. Murphy Rebuttal Testimony of Mark Israel at 11-31; Povacz Rebuttal Testimony of Mark Israel at 11-26; December 8, 2016 Povacz Transcript at 1470-1516.

Dr. Israel's overall medical opinion is that exposure to electromagnetic fields from PECO's smart meters have not been and will not be harmful to Complainants' health. He holds both his symptom-specific and overall medical opinions to a reasonable degree of medical certainty. Murphy Rebuttal Testimony of Mark Israel at 31-32; Povacz Rebuttal Testimony of Mark Israel at 26.

VI. PECO offers its customers, including Complainants, reasonable alternatives regarding AMI meter installation

In remanding these AMI/health cases for hearings, the Commission has raised the question of whether PECO can offer some accommodation or alternative to customers, such as Complainants, who have concerns about AMI meters. In its January 28, 2016 *Kreider* Order, the Commission elaborated on the kinds of accommodations or alternatives that might be possible, stating (p. 23) that: "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."

As to installation of the smart meter in a different location, Mr. Pritchard testified that under PECO's Tariff, Rules 3.2 and 3.4, the customer has the option of relocating the meter to a different location. This is because, while PECO chooses the type of meter, the customer chooses the location of the meter board and socket. If the customer would like a different location for the AMI meter, they can hire an electrician to move the meter board/socket to a new location on

their property. This will, in some situations, require work on the PECO system as well to extend its conductors to the new meter board location. PECO would view such changes to its system to be "for the accommodation of the customer" and thus, under PECO's Tariff Rule 6.2, the customer would be responsible for the cost of the changes to the PECO system. But those changes are all within the control of the customer and, once they are made, PECO would install the AMI meter at the new, customer-chosen, location. Murphy Rebuttal Testimony of Glenn Pritchard, at 10; Povacz Rebuttal Testimony of Glenn Pritchard at 16; PECO Exh. GP-3.

PECO notes that this option remains open and, if Complainants wish to explore this option, PECO will work with them to relocate their meter.

As to installing a "different type of smart meter," PECO's Tariff has a provision that allows third parties to come onto its system and provide such technology, on a competitive basis. Rule 14.1 allows for an Advanced Meter Services Provider ("AMSP") to provide Advanced Metering Services, which presumably may, in the future, include "different types of smart meters." Currently, no AMSPs are licensed by the Commission to do business. However, if the market develops and makes such meters available, then PECO's Tariff already contains a provision that allows for such meters to be deployed, subject to the third party being licensed by the Commission, the meters meeting the requirements of Act 129, and the AMSP's services being properly integrated into PECO's computer systems. Murphy Rebuttal Testimony of Glenn Pritchard, at 10; Povacz Rebuttal Testimony of Glenn Pritchard at 16; PECO Exh. GP-3.

VII. State public utility commissions that have examined whether AMI meters cause or contribute to health effects have concluded that AMI meters are safe and that their use is reasonable.

This is one of a series of seminal cases in Pennsylvania that allow an evidentiary examination of whether radio frequency fields from AMI meters cause or contribute to adverse health effects. PECO notes, however, that there have been numerous evidentiary investigations into that or similar issues conducted by state utility commissions in the United States. Those other state commission investigations variously concluded that radiofrequency fields from smart meters fall well under established guidelines, are not a threat to human health, and do not warrant additional state utility commission regulation – in other words, that the use of such meters is reasonable.

In their Main Brief, Section VIII, Complainants preemptively argue that these other state Commission proceedings should not be persuasive because, they claim, all of the states involved offer an opt-out.

The findings to which PECO brings this Commission's attention have nothing to do with an opt-out, and could not be altered by the presence or absence of an opt-out. To give but one example, the District of Columbia Commission stated that: " ... the Commission has found no credible, scientific evidence to show that the level of RF emissions from the Pepco smart meters is a threat to human health." It's difficult to imagine how the presence or absence of an opt-out could alter that finding.

Specifically, PECO is aware of the following investigations and conclusions from other state commissions:

- California Public Utilities Commission, Application of EMF Safety Network for Modification of D.06-07-027 and D.09-03-026, December 6, 2010: "In summary, the RF emissions produced by Smart Meters is extremely small in comparison to

the RF emissions from many other commonly used devices and far below emission standards set by the FCC, which licenses or certifies the Smart Meters used by PG&E. Since the Commission generally does not delve into technical matters which fall within the expertise of another agency, in this case we defer to the FCC, which possesses extensive expertise on its staff for evaluating and licensing or certifying Smart Meter devices that operate via the use of wireless technology."

- District of Columbia Public Service Commission, Investigation Into PEPCO's Smart Meters. September 20, 2013: " ... the Commission has found no credible, scientific evidence to show that the level of RF emissions from the Pepco smart meters is a threat to human health."

- Florida Public Service Commission, Smart Meter Briefing Sheet (undated): "The Commission concluded that health standards for smart meter RF emissions are set by the FCC, that smart meters operate within established authorized standards, and that the State would not implement any additional standards for smart meter RF emissions.

- Maine Public Utilities Commission, Request for Commission Investigation into Smart Meters and Smart Meter Opt-Out, Docket No. 2011-00262, March 25, 2014: "For the reasons discussed in this Order, we conclude that Advanced Metering Infrastructure (AMI), including the use of "smart meters," as implemented and operated by Central Maine Power Company (CMP or the Company), is a safe, reasonable, and adequate utility service as required by statute." [The reasons discussed in the Order include the following.]

  i. "There are no credible, peer-reviewed scientific studies in the record that demonstrate, or even purport to demonstrate, a direct human health risk specifically from smart meter RF emissions;"

  ii. "CMP's installation and operation of its smart meter system is consistent with federal and state energy policy and is a generally accepted utility practice throughout the country."

- Maine Public Utilities Commission, Request for Investigation Into Smart Meters and Smart Meter Opt-Out; Request for Commission Investigation into Central Maine Power Company and Smart Meters, December 19, 2014: "As discussed in this Order, we find that Advanced Metering Infrastructure (AMI), including the use of "smart meters," as implemented and operated by Central Maine Power Company (CMP or the Company), does not present a credible threat to the health and safety of CM P's customers and, based on the record of this proceeding is, therefore, safe."

- Massachusetts Department of Public Utilities, Investigation by the Department of Public Utilities on its Own Motion into Modernization of the Electric Grid, June

12, 2014: "[A]fter thorough review and consideration of the issue, the Department is unaware of any credible, peer-reviewed scientific studies that demonstrate a direct human health risk from exposure to the low-level RF signals from advanced meters."

- Michigan Public Service Commission, U-17000 Report to the Commission, June 29, 2012: "After careful review of the available literature and studies, the Staff has determined that the health risk from the installation and operation of metering systems using radio transmitters is insignificant. In addition, the appropriate federal health and safety regulations provide assurance that smart meters represent a safe technology"

- Nevada Public Utilities Commission, February 9, 2012: "Smart meters meet the FCC emission standards and the RF emissions from smart meters are far lower than the FCC guidelines .... The FCC has taken a very conservative approach to RF exposure compliance for low-power network devices such as smart meters. The FCC 'is continually monitoring the issue of RF exposure and related health and safety concerns, both in general terms of the continuing propriety of its regulations, and in individual cases where substantive concerns are raised."

- New Hampshire Public Utilities Commission, Joan Wirth Request for Hearing on Installation of Smart Meters, Order Denying Hearing Request, September 6, 2012. "Based on this product information, we find that the NHEC basic, or standard, smart meters meet applicable FCC RF exposure limits. Having determined that the NHEC basic, or standard, smart meters meet FCC limits for exposure to RF radiation, we must consider whether we need to accept the FCC limits on exposure to RF radiation or seek other guidance on the health and safety of the Elster Type R2S meters."

  "Having determined that NHEC's meters meet the FCC RF emissions limits, we will not explore a separate state standard for RF emissions because we find that the FCC limits pre-empt a separate and potentially conflicting state standard."

- Public Utility Commission of Texas, Report on Health and Radiofrequency Electromagnetic Fields from Advanced Meters: September 6, 2012: "Staff has determined that the large body of scientific research reveals no definite or proven biological effects from exposure to low-level RF signals. Further, Staff found no credible evidence to suggest that advanced meters emit harmful amounts of EMF."

- Vermont Department of Public Service, An Evaluation of Radio Frequency Fields Produced by Smart Meters Deployed in Vermont, January 14, 2013: "The FCC MPE values were derived with the inclusion of a safety factor of 50 below the actual threshold of hazard from prolonged exposure. When the above estimated RF field exposures for GMP and BED meters at the closest distance of one foot are considered in this light, this means that the most conservative estimates of

potential exposure range between approximately 75,000 and 156,000 times less than the hazard threshold respectively."

"Using the highest indicated results from the measurements performed in this study, potential exposure of individuals to the RF fields associated with the currently deployed smart meters in the GMP and BED service territories is small when compared to the limits set by the FCC. It is concluded that any potential exposure to the investigated smart meters will comply with the FCC exposure rules by a wide margin."

VIII. Conclusion

PECO respectfully submits that, on the record evidence in this proceeding, the Commission should follow the lead of the other state commissions and find that there is no reliable medical basis to conclude that radio frequency fields associated with AMI devices could cause, contribute to any health effects or exacerbate any symptoms, including Complainants' PECO therefore submits that the Commission should conclude that the use of AMI meters to provide service to Complainants is reasonable utility service for purposes of 66 Pa. C.S. §1501.

Proposed Conclusions of Law

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

2. The Complainants must establish their case by a preponderance of the evidence. *Samuel J. Lansberry, Inc. v. Pa. Pub. Util. Comm'n*, 578 A.2d 600 (Pa. Cmwlth. 1990), alloc. den., 602 A.2d 863 (Pa. 1992).

3. The Complainant have not met their burden of proof of establishing an offense in violation of the Public Utility Code, the Commission's regulations or an outstanding order of the Commission. 66 Pa.C.S. § 701.

4. PECO did not provide unsafe or unreasonable service in violation of 66 Pa.C.S. § 1501.

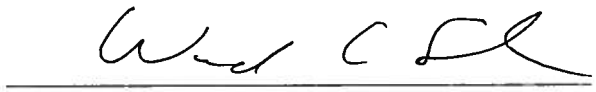
Proposed Ordering Paragraphs

For the reasons set forth above, PECO respectfully requests that the Commission issue an Order in this proceeding that states:

1. That the Complaint is dismissed; and

2. That PECO may install AMI meters at the Complainants' residences.

Respectfully submitted,



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October 23, 2017