BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Alexia L. McKnight and Lawrence K. McKnight Complainant,	:	
v.	:	Docket No. C-2017-2621057
PECO Energy Company Respondent.	:	

COMPLAINANT REPLY BRIEF

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1 INTRODUCTION

This brief is in reply to the PECO Main Brief (http://www.puc.state.pa.us//pcdocs/1573522.pdf) and extends discussion of the McKnight Main Brief (http://www.puc.state.pa.us//pcdocs/1573682.pdf) in Docket C-2017-2621057.

Two late filings are referenced:

1. One regarding a PECO Exhibit GP-13 (http://www.puc.state.pa.us//pcdocs/1567065.pdf)
2. Another regarding Dr. Rea (http://www.puc.state.pa.us//pcdocs/1566866.pdf)

There is also some discussion of a Motion for PECO to admit *pro hac vice* under *nunc pro tunc* as it relates to the testimony of Dr. Davis and Dr. Israel.

1. For a Mr. Watson (http://www.puc.state.pa.us//pcdocs/1577012.pdf)
2. And for a Mr. Renner (http://www.puc.state.pa.us//pcdocs/1577249.pdf).

Note:

We have noticed that the 4/13 transcript appears to have had edits that resulted in changed line references. In our Main Brief and this reply, our references should be primarily based on transcript copies generated as of May 15. However, the May 15 version of the 4/13 transcript was not searchable. We refer to this as Tr. 4/13. A searchable version of the 4/13 transcript became available to us on June 19. In this document we will refer to this as 4/13c. However, as we submitted our Main Brief on June 27 we did not realize that the searchable version had different line numbering so may have referenced some line numbers incorrectly because it is unclear if the reference point in the Main Brief was established before or after June 19. The differences in references are generally within 1 page up or down.

2 PROPOSED FINDINGS OF FACT

Overall, we find PECO's proposed findings of fact highly slanted, obviously mischaracterizing facts, and inclusive of many PECO opinions that are not facts. The errors are voluminous, and therefore item numbers in PECO's Main Brief, are prefixed with a 'PPFF' to identify a response to a numbered item in PECO's Main Brief section of Proposed Findings of Fact.

2.1 TESTIMONY OF ALEXIA MCKNIGHT, D.V.M.

Regarding PPFF 6. PECO's specific and repeated call out to "Cardiovascular Symptom" for reasons of privacy purposes is obviously questionable. While we appreciate that PECO might consider our privacy, we did not specifically request any special call outs here and PECO does not follow this privacy rule for any other of Alexia's symptoms such as headaches and difficulty sleeping. Nor is Dr. Rea's diagnosis list abstracted for privacy purposes in their PPFF 109. Indeed, "Cardiovascular Symptom" is the only place where they appear to be concerned about Alexia's privacy.

PECO's wording here is clearly not due to concerns over privacy. It's because they know that the "Cardiovascular Symptom" was and is serious in nature and they wish to minimize and obfuscate this.

The 'symptoms' are palpitations (a chest sensation of an irregular heart beat) and lightheadedness. But the 'symptoms' were in association with an irregular and marked bradycardic (slow) pulse as objectively measured by a Veterinarian who is familiar with a technique of checking their own pulse (Tr. 4/10 at 71:12-16) and further witnessed and testified to by her husband, a licensed, board certified physician (Tr. 4/10 at 126:20-22).

An irregular, slow heart beat is, by definition, a cardiac arrhythmia – the absence of a normal heart rhythm. An arrhythmia is not a 'symptom'. It is an objective medical 'sign.' These definitions can be looked up easily if there is any question to this.

There are various kinds of arrhythmias and severities of arrhythmias, however this arrhythmia was marked for its frequency where Alexia stated, "I was having more skipped beats than beating beats" (Tr. 4/10 at 12:13-14) and occurred in the setting of other symptoms including lightheadedness. This is indicative of a highly significant and severe arrhythmia. The combination of an irregular, slow heartbeat and symptoms of lightheadedness is strongly suggestive of the heart not beating regularly or effectively enough to perfuse the brain. This can cause the person to have a syncopal event (loss of consciousness) leading to falls and accidents. Depending on the nature and duration of the arrhythmia, they can trigger other types of arrhythmia's, cause clot formations in the heart that can break free and cause strokes. And they can result even in death.

Arrhythmia in this setting thus can warrant significant concern, and is why both Dr. L. McKnight and Dr. Prociuk both advised Alexia to see Dr. Saleem right away. It is discussed further below.

Regarding PPFF 19. This is a misinterpretation of Alexia's words. Alexia was emphasizing that this is a specialty area where she felt there was no one 'on the planet' *as* experienced in EHS as Dr. Rea, and was not implying that there was no one else on the planet that knows of the subject. However, this is still quite a subspecialty, and it may require going out of state to find people with appropriate specialty. Indeed, PECO's witnesses are from out of state also. However, Dr. Rea was a pioneer in this field, has written several papers on the topic and has the most sophisticated lab.

Subspecialty does not indicate 'immature' as PECO later implies in the section of Dr. Prociuk's testimony. It means that only a handful of people are extremely versed in the topic. For example, there are likely only a handful of people that have experience working with Aarskog syndrome – a rare genetic disorder. This does not mean that we would deny its existence or question if there was enough science to make a diagnosis or differentiate it from the related but more common Noonan syndrome.

2.2 Testimony of Lawrence McKnight, M.D.

Regarding PPFF 39. PECO's statement that Dr. L. McKnight "recognizes that the published research on EHS does not support the conclusion EHS is caused by exposure to EMF" is a gross mischaracterization. Dr. L. McKnight never made such a statement and in fact refuted this. Instead, he recognized that some published research (not all 'the' published research) on EHS (or IEI-EMF) has stated that it did not find conclusive evidence to support that EMF causes EHS. But on initial glance he first believed this literature, then later after more extensive and detailed review of this literature he found it significantly flawed and statistically invalid. He gave extensive explanation on why and how those authors specifically made mistakes that led to the erroneous conclusions.

Also, Dr. L. McKnight never indicated "the published research" (as in all or even the 'majority' of published research says this), but specifically referred to a limited set of influential studies (in particular those reviewed by a Dr. Rubin in a systematic review) and those cited in Dr. Israel's pre-filed report. These studies were reported to be negative and appear to imply that EHS may not be caused by EMF. But, on closer examination these studies are NOT negative to mean 'does not support the conclusion EHS is caused by EMF', but instead are invalid (Tr. 4/10 at 171:14-17). Interpreting these invalid studies as 'negative' to mean 'EMF does not cause EHS' would be to commit a type II ('false negative') error (McKnight Exhibit 6 at page 8).

The impact of this is discussed further below.

Regarding PPFF 40. PECO's listing of events as 'findings of fact' is again a gross mischaracterization. Dr. L. McKnight explicitly stated this was similar to a blinded study, but NOT the real-world equivalent to a scientific experiment (Tr. 4/10 at 195:10-14). Instead, he explicitly clarified that the unusual nature of the described event in the car was NOT dependent on any natural blinding that might have occurred, but instead was based on the words Alexia said ("What did you do? It's Gone!"). The words, not the blinding established that a nocebo effect could not be playing a role (Tr. 4/10 at 195:23-25).

Alexia was asking a question about what stopped the symptoms. But, since a nocebo effect is a thought triggered pathway by which a patient sees something and that stimulates a thought trigger or belief it can cause the pain (even though it's only the thought that actually causes), it would be incompatible for somebody to have a thought 'it IS causing' at the same time they are questioning 'what is causing'. The thought trigger is either there or not, but in this case asking 'what' established that the thought trigger wasn't there. It's incompatible with the fundamental nature of what a nocebo even is.

PECO's description is fixated on the fact that Alexia might not have been blinded. But, that is not what Dr. McKnight felt was unusual. It was the fact that he had never seen a person with a placebo or nocebo effect sincerely ask 'what' the cause was, and that event changed the probability of items in his clinical diagnosis process (explained further below).

Up to that point, Dr. L. McKnight believed that Alexia's symptoms could have been explained by Nocebo. But Alexia's words caused him to pause and reflect – How is this medically possible? If not Nocebo, what if I'm wrong and this is really is from EMF? How could the WHO have missed this? This caused him to go back and review the literature more carefully, and then found that there were many problems with the randomized provocation studies, and the systematic review of Dr. Rubin, and the WHO's dependency on his flawed analysis.

Later, Dr. Rea established via double blinded provocation studies that Dr. L. McKnight was correct that Lexi does trigger from the real EMF. Alexia's symptoms are NOT explained by Nocebo (Tr. 4/12 at 69:1-6).

Regarding PPFF 43. The first sentence "Scientific research can also have Type I errors" is true, however the second sentence "There are various ways to … double blind designs" is PECO's assertion which is not supported by the testimony. And, is frankly false.

Replication and conjoined analysis are ways to increase sample size, and therefore increase confidence (e.g. decrease the size of error bars). Blinding (either single or double) is a method of ensuring that placebo/nocebo effects are not playing a confounding role in a therapeutic trial. The double blinding is

to ensure that the experimenter is not giving clues that can be secondarily interpreted and cause a placebo/nocebo effect.

These methods do not have anything to do with false positive studies or false negative studies per say. For example, a single well designed large study is often more protective against threats to validity than combining 2 small dis-similar and poorly designed studies. And, blinding would not help if the clinical question was a diagnosis or prognosis question. Indeed, this is one of the major problems with Dr. Rubin's systematic review. It reviewed very small poorly designed studies and ignored all other evidence.

If the study design is incorrect, or the study is otherwise invalid, these studies may be performed in blinded fashion and at infinitum and they will still be invalid. In fact, the spectrum bias issue listed is in fact one issue that would not be addressed by any of these methods and why spectrum bias is such an important error to consider.

There are many other issues to consider in conjoined analysis to consider such as errors due to combining many small studies that may have resulted from a publication bias. These issues are explicitly listed in the book referenced in Dr. Mcknight Exhibit 14, but as separate chapters 22-25.

Regarding PPFF 45. Again, PECO totally mischaracterizes Dr. L. McKnight's referenced testimony and demonstrates why utility companies have no expertise in the interpretation of medical literature and should not be attempting to do this.

First, the phrase "The EHS studies" is mischaracterization. There are many other kinds of studies on EHS, but the literature discussed was specifically about 50 randomized blinded provocation studies. It's not 'the' EHS studies, but 'a few' studies about EHS.

Next, in specific testimony reference (Tr. 4/10 at 168-175), the discussion was limited to only a couple of those studies, where authors discuss possible problems with their studies, as nearly all studies do. PECO apparently is attempting to argue that this section is discussion of type II error. This section is not necessarily to discuss type II error per say, but if the study is reported negative, this section may report on some considerations that could lead to a type II error. However, this section is not generally considered to be an authoritative and definitive analysis of the subject.

A small discussion section where the author lists potential problems with their study, this does not mean the authors 'dismissed' any and all other problems. To 'dismiss' the argument they would have to specifically mention it, and discuss why it didn't matter. Instead, with respect to the issue of spectrum bias in the referenced testimony, the authors overlooked the issues and did not mention it at all.

And, with respect to other issues partially mentioned in the papers (e.g. discussion of drop outs), even if an author discussed it, it does not mean that the author mentioned or applied the appropriate techniques to deal with the issue. In the case of drop outs, the author should provide data on how the study would have resulted if the drop out is included under both possible outcomes, and compute the statistics both ways to see if the effect of that drop out mattered to the conclusion. This is called intention to treat analysis and is discussed in McKnight Exhibit 14.

As discussed in the Main Brief, and as referenced by McKnight Exhibit 14, the medical literature is intended for an audience that is aware of how to correctly interpret studies, it requires training to know

read and interpret the literature correctly. This training specifically REQUIRES that readers be on the lookout for important omissions and specifically not rely on the authors opinions and conclusions, but instead base their decisions on what the authors did, and what the data shows.

It is not clear how PECO lawyers who are untrained on how to read the medical literature could ever state that the authors 'dismissed' or even reference what was concluded from an author without interpretation of an expert witness like Dr. L. McKnight. Wouldn't this be considered hearsay or speculation?

Regarding PPFF 46. This is a mischaracterization at two levels. First, the WHO has never concluded "EHS is not caused by exposure to EMF". The WHO concluded that "it is *not established* that EHS is caused by EMF." PECO's characterization is a statement of certainty that WHO has established 'not caused'. What the WHO states is an uncertainty of cause. They state they do not know if EHS is caused by EMF, and are unwilling to declare yet that it is (see McKnight exhibit 6, page 6).

However, it is true that Dr. McKnight believes the WHO misinterpreted the studies quoted in Dr. Rubin's systematic review and missed the detail that the study designs were inappropriate because of the issue of spectrum bias. They erroneously called for an incorrect study design to be relied upon. Committees missing such details like this is not at all uncommon. This is discussed below.

Again, PECO is arguing from hearsay. The committee members of the WHO are not here for the McKnight's to cross examine. Dr. Israel can argue that he based his opinion on the WHO recommendation, but that does not rebut an argument that Dr. L. McKnight found significant flaws in the way the WHO reached its conclusions.

Regarding PPFF 48. See Regarding PPFF 39. This long explanation is hardly a 'finding of fact'. It is an attempt for PECO to construct a false image. PECO can state 'the Florida car incident was not double blinded' if they like. It was not, nor did Dr. L. McKnight ever state that it was double blinded. But, Dr. McKnight's point was that it did not require blinding. The 'vivid event' was a realization the nocebo effect was ruled out through Alexia's words indicating that her thought pattern was incompatible.

Regarding PPFF 49. The statement that Dr. McKnight accepted a possible alternative explanation is taken out of context, and does not relate to the Florida experience conclusions. 'Possible', does not mean likely (many things are 'possible'), and by the context refers specifically to the effects of Bluetooth only.

This is clear because Dr. McKnight also followed (Tr. 4/10 at 197) to say "…I could not explain how a NOCEBO effect could cause somebody to say 'what did you do; it's gone.'' which is the major point. Even if the symptoms were from the plane ride, and a result of a delayed effect, it doesn't explain how the thought trigger could rapidly come on to cause symptoms, then disappear with her asking 'what happened?'

As yet another explanation of this, consider how CBT – the proposed therapy for Nocebo works (McKnight Exhibit 6, at 1). The reason why CBT has been proposed is a model where thoughts are creating feelings, and feelings creating behaviors and behaviors reinforcing thought, and this creates a vicious cycle. The goal of CBT is to slow down and break the cycle. But, Alexia demonstrated at that moment in Florida where there is no cycling to break. Something independently triggered and relieved – like real EMF.

2.3 TESTIMONY OF RUSSELL BROCATO

Regarding PPFF 51. Mr. Brocato testified that there is nothing unusual about him *being called* to jobs with stray voltage. There was something unusual about this job, however. It took well over a year to complete. It leads to a situation where Alexia had a natural experiment with and without AMI meter installation. It was also unusual in that Mr. Brocato states (Tr. 4/10 at 209:14) that he gets normally gets called to farms. This was a residential house, not a call to a 'farm.' Therefore, Mr. Smith immediately objects on line 20.

PECO's unusual fear about Mr. Brocato's testimony is quite strange and palpable in the courtroom. It is as if they know something we don't and have not asserted, but could somehow could be damaging to them. Perhaps this is because in farms there has been successful litigation against power companies about such issues?

2.4 TESTIMONY OF PETER PROCIUK, M.D.

Regarding PPFF 54. Dr. Prociuk integrates conventional methods and other alternative methods in his practice.

Regarding PPFF 58. Stating that Alexia's 'cardiovascular symptom' is 'relatively benign' is not a finding of fact. To the extent there is any truth in it, it is because PECO's attempt to introduce ambiguity in terms and time periods.

The Infrequent VPC's and APC's as described on the halter monitor were obtained during a period when Alexia testified that she was NOT having symptoms. These infrequent VPC's and APC's are benign. However, the testimony at Tr. 4/11 302:14-19, makes it clear that when they occur at high frequency VPC's and APC's are not benign, and at 303:6-18, makes it clear that the combination of light-headedness, associated with bradycardia would be a "very significant problem."

This is why 2 physicians – Dr. Prociuk and Dr. McKnight both strongly advised that Alexia needed to see a Cardiologist right away. Whatever arrhythmia was occurring (it isn't clear if these are the same VPC's at higher frequency, or if some other kind of arrhythmia occurred), they were not 'benign.' However, the problem was solved by removing the AMI meter the next day, so the Cardiologist found a month later that Alexia's heart was back to normal.

This issue is discussed at length below in the section under Dr. Alexia McKnight's testimony.

Regarding PPFF 61. This is a gross mischaracterization of the study by Lamech (Prociuk Exhibit 3). In the Lamech study, participants were not determined by 'self-identify as having EHS'. Instead, a question was asked about this, but the abstract even points out that the majority of participants DID NOT self-identify as having EHS. The study specifically reports that most of the reported incidence did not come from people that knew about or had symptoms from other devices, but reported symptoms because of symptoms from the smart meter as a first occurrence. And, of note, 17% of patients noted associated symptoms of heart palpitations, dizziness and other symptoms such as insomnia. These symptoms are quite similar to the kinds of symptoms that Alexia reported. These patients may have EHS, but only found through the event of smart meter installation. Like Alexia, the AMI meter for some reason seems to be a particularly strong stimulus to trigger symptoms (e.g. perhaps because of modulation effects,

perhaps because of conducted emissions, or perhaps because of the longer-term effects occurring during sleep).

Note that Lamech is a study specifically about smart meters. It is not a study on patients with EHS. It represents literature that is independently suggestive for smart meter causality to symptoms like palpitations and insomnia. It supports Dr. Rea's experience that many have identified that smart meters cause exactly the kinds of symptoms described by Alexia.

Dr. Prociuk admits that a case series alone is not enough evidence to directly show causality in a general sense. Medical causality in the general sense is typically determined from a wide range of studies, and case series can be used in this analysis as support. However, in this case we are not attempting to prove medical causality in a general sense. We have established it in an individual sense. Clinicians do this, and typically don't write scientific papers to document things other than sometimes writing what is known as a case report, which can sometimes lead to a case series. But, the Lamech study supports that others have seen the same experience, and more streams of evidence would establish medical causality for smart meters in general and independently from causality in association with EHS.

Regarding PPFF 63. See the discussion in Main Brief on discussion about 'diagnosis' in burden of proof commentary. While it is true that Dr. Prociuk was unaware of the diagnostic testing that Dr. Rea could perform, Dr. Rea would likely disagree with a statement 'There is no diagnostic test for EHS' since he performed blinded provocation in Alexia, which is a diagnostic test.

But, diagnostic testing in this context is actually irrelevant in a more general sense because as mentioned in the Main Brief the goal in clinical medicine is to treat the patient, and the term is used differently from its purpose in research.

In research diagnostic criteria are a ruleset called a 'clinical case definition' to see if a subject can be grouped to the same label. For most diseases this tends to create a lot of controversy because everyone tends to have a different opinion on how the groups split or what is or is not 'in'. Occasionally, there is agreement on a singular sign or test that is called a 'pathognomonic.' This sign or test would be 'diagnostic' on single observation – like a jump to the correct answer. But, this is the rare exception.

Usually any research diagnosis label only comes about because there has been agreement to define the disease state in terms of the test result being above an arbitrary level (e.g. 'Diabetes' being defined as fasting blood glucose levels > 126mg/dl), and then subsequent debates if another lab test can also work to officially be 'in' (e.g. can a patient with a Hemoglobin A1c (HbA1c) > 6.5% also be labeled as having 'Diabetes', even though their fasting blood glucose was not checked or was not >126mg/dl).

In this labelling process, tests may not even be involved. For example, there is no 'diagnostic testing' for Migraine Headache either. This diagnosis is made entirely from subjective history of the patient. This does not mean Migraines don't exist, or that research isn't done on Migraine, or that physicians don't tell patients to manage Migraine triggers including things such as lifestyle changes in routine meal schedules, and/or sleep hygiene, and/or avoidance of activities that seem to be triggering.

There is often debate and controversy and warring factions arguing over when the cut points are wrong. For example, what exactly is 'Sepsis' and who can or can't be included (https://lifeinthefastlane.com/ccc/sepsis-definitions/). Or when exactly can you call someone 'Hypertensive'. These things change every couple years, and for example the criteria and labels in

Canada (http://guidelines.hypertension.ca/diagnosis-assessment/diagnosis/) is different than the US (https://www.acc.org/latest-in-cardiology/ten-points-to-remember/2017/11/09/11/41/2017-guideline-for-high-blood-pressure-in-adults). The disease process in a patient doesn't change because a patient crosses the border. The label does.

Because of these controversies or lack of 'tests', Physicians don't deny that diseases sepsis isn't real or things like migraine can't be caused by things like exercise, odors, or weather, even while there have been no blinded provocation studies to 'prove' that these things are causal and not caused nocebo effects. Instead, clinicians accept that sometimes the patients really can tell the truth when they say that they get headaches with certain activity, and avoidance of certain activities helps, and this history can be weighted as evidence for migraine.

And, clinicians act. They recommend. And they do this regardless of any problems with the formality of labelling. Clinical medicine is different because there is a singular patient to address. Here, the goal is a determination of probability of a situation existing in a patient with purpose of assigning an appropriate therapy that could address or impact that situation in positive ways. For example, in the case of Migraine it could be based entirely based on the history – a believable patient telling a story that makes sense and 'fits', and a therapy likely to help even if one part of the story didn't fit exactly.

The clinical diagnostic process described further below. It is well described and easily referenceable (including in the book of McKnight Exhibit 14). It's how doctors work even if they don't understand the formality of it. Briefly, in the clinical diagnostic process any symptom, exam finding or laboratory test is represented as a likelihood ratio that changes a pretest probability to a posttest probability of disease (some labeled medical hypothesis that explains what's going on and therefore what might be helpful to make it better). 'Diagnosis' is made by having a single item that is more likely than other diagnostic possibilities combined. It is simply that the weight of the evidence (symptoms, signs, tests, etc.) most strongly supports some medical theory about what is causing the patients problems.

Finally, the legal issue addressed by the physicians is related to the evaluation of safety risk an individual patient (in this case Alexia), not any statement of safety as it applies to all people. So, the bottom line to PPFF 63, is -- so what if Dr. Prociuk didn't make his diagnosis from a 'diagnostic test'?

Would PECO also argue that Migraine doesn't exist because there is no diagnostic test for Migraine? Would they also argue that Sepsis isn't a 'real disease' because there are disagreements in when it can or can't be called?

A utility company should not be arguing with a physician about how medical diagnosis and therapy works, or how it applies to individual patients because they do not understand Medicine. They should leave that job to the treating physicians.

Regarding PPFF 64. The second sentence 'Before the conclusions of the Rea study… and that hasn't been done' is not a finding of fact, was never testified to, and is only an opinion of PECO. See discussion of 'scientific establishment' in burden of proof commentary of our Main Brief. There is no such body that ever determines when or if something is scientifically or medically 'established', nor any 'rules' that states that studies must be replicated to become 'scientifically established', or frankly even that a study needs to be done to become 'scientifically established.' In medicine, for example it is common that studies cannot be performed because of ethical considerations. This is exactly why Dr. L. McKnight

introduced McKnight Exhibit 10. There are no replicated randomized control trials studies to show that parachutes work, but that does not have anything to do with that fact that most everybody including scientists would accept their utility. With need to jump out of an airplane is a good bet most reasonable minds would choose to overlook the fact that they could not find a scientific article, and instead use their common sense to conclude that the theory sounds plausible and 'better safe than sorry.'

Regarding PPFF 65 and 66. Statements about 'science is in a state of clinical infancy' are not findings of fact, but a constructed opinion of PECO.

Again, there is no definable line where any science is established in a 'clinical stage of infancy' when discussing the maturation of a science, or point where science becomes 'established' because there is no authority body that could do this. Even if there were, it would represent a false appeal to authority since the understanding is constantly shifting and there is no way to say that one medical authority has precedent over another. Therefore, this is a hypothetic comparison constructed by PECO which Dr. Prociuk clarified by saying 'relatively speaking' (Tr. 4/11 at 289:1). This means it could be said EHS is not as well understood relative to the understanding of some other diseases.

Indeed, both Dr. Israel (Tr. 4/13 at 285:24-25; 4/13c at 284:13-14) and Dr. Davis (Tr. 4/13 at 154:11-12; 4/13c at 154:5-6) admit 'the symptoms are real' and the literature is clear that the syndrome does exist, there are many patients that have symptoms, and that the focus should be on attempting to find what helps these patients. While there is debate over exactly who or what symptoms to include or not, the syndrome in general has been described for quite some time. The scientific and medical debate is not over if this is in 'infancy' or 'established,' and for that matter isn't even over if sometimes a nocebo effect may be playing a role. The only scientific question is instead a question if 'symptoms are ALWAYS due to Nocebo effects', vs 'there are SOME patients in which EMF is causing symptoms'. In that question there is scientific debate and clearly people on both sides. But no polls have ever been taken to know if 50% or more of scientists or doctors believe 'ALWAYS' vs 'SOME', and no way polls could ever be accurate. Depending on which scientist or physician is talking, they believe one way or the other. And, both sides assert that the preponderance of the scientific evidence is clearly on their side because they disagree on how much weight should be assigned studies they agree with, and how much weight should be assigned to studies they disagree with.

2.5 Testimony of William Bathgate

Regarding PPFF 76. This statement not a finding of fact because there are too many things cobbled together. PECO attempts to mischaracterize or distort Mr. Bathgate's tests and wording by picking out and emphasizing a single spot where he used layman's language or 'spiky spot' in an attempt to clarify which point of the actual graph the judge was looking at. PECO conveniently leaves out the correct technical explanation Mr. Bathgate also gave, but also the fact that the quantifiable values were given and specifically measured at more than 1,200 times the relevant FCC specification levels.

Regarding PPFF 85. "I can't explain it" is a gross mischaracterization of Mr. Bathgate's testimony, taking a single phrase out of context. The testimony Tr. 4/11 at 387 begins with a question "can you explain that phenomena" and Mr. Bathgate states "Certainly" then continues for the next several pages of transcript to describe in detail exactly how and why the phenomena occurs. The statement "I can't explain it" was in a larger statement where he expressed his exasperation the first time he noticed the effect and was surprised by it, but then after investigation he found the reason why and DID explain it.

This is his long explanation beginning on at 387. He goes further to clarify that since his moment of exasperation, he's noticed it several times, and specifically determined that the effect is associated with the radio of a smart meter because replacement of the smart meter with an opt-out meter (one that has a switch mode power supply, but does not have the radio) has been shown to make the effect go away.

Regarding PPFF 86. This is a non-sensical statement with double negations. It reads roughly "meters do not contain something are not also used in other devices, therefore they are not unusual". We don't know what this means, but reasonably sure this is not a finding of fact.

Regarding PPFF 94. This is a mischaracterization of Mr. Bathgate's testimony. Mr. Bathgate did not state that the FCC does random tests on AMI meters. He stated that the FCC can do random tests on products if there is a report of a suspected violation. This is relevant because although 10's of millions of the devices may have been deployed over the last several years, it is highly unlikely that they would be reported since it requires detailed knowledge of the FCC specifications, and use appropriate test equipment. The vast majority of people would not know to even check for this, much less know how the test needs to be conducted.

Regarding PPFF 99. See explanation in Main Brief for discussion about measuring at 1-meter vs 2-meters distance and why it does not matter. The manual also does not state 'measuring at a distance of less than 2 meters it is not possible to identify the source of transmission'. It states:

> *"Do to the physics of wave generation it is not possible to reliably measure the customary "power density" (W/m2) in the close vicinity of the source of radiation. For the instrument described here the distance should be in excess of 2 meters." (emphasis added)*

Mr. Bathgate was not using the meter to determine the precise *power density*. He stated only that it 'peaked' the meter, and he did not have the attenuator to make the meter read at higher levels. The 'physics of wave generation' is explained by Dr. Davis to show that the meter is in the far field, which it clearly was above a few inches even. So, the 2 meters is only to ensure accuracy in value shown the power density.

There is nothing in the manual that states that this 2-meter distance is how identification of sources is determined. Instead the manual talks about the importance of using the directional antenna to point in the correct direction.

For what it is worth, the PECO late-filed Exhibit 1 was also not filed on time.

Regarding PPFF 101. This statement that the FCC *conducted emissions* standard not applying to licensed transmitters is totally false. Not only does the transcript reference refers to *intended RF* transmission standards, Mr. Bathgate never testified to the fact that there was exemption for licensed transmitters to violate *conducted emission* standards, and we can find nowhere in the FCC specifications where such an exemption exists.

Mr. Bathgate did incorrectly reference intended RF transmission limits for unlicensed transmissions (Complainant Joint Exhibit A, page 18) which do not apply to PECO since they have an FCC license which he found out about late, and he failed to notice that his reference was incorrect given that new information. However, he corrected this misstatement (Tr. 4/12 at 10:3-11:12), we withdrew our

assertion here. But he further clarified that the other testimony on conducted emissions *does* still apply (Tr. 4/12 at 11:13-17).

Additionally, later Mr. Pritchard introduced the license grant to make his statements and inadvertently stated that the meters are still operating outside of that FCC license grant anyway (Tr. 4/12 at 154:25; PECO Exhibit GP-5, PECO Exhibit GP-12).

Regarding PPFF 102. PECO's statement again mischaracterizes what Mr. Bathgate testified to. The McKnight's do not have an analog meter currently installed, they have a jumper plate which was installed by PECO technician Russell Brocato. Mr. Bathgate never stated that an analog meter was installed, nor did he claim that the transients were 'in compliance'. He testified that he measured the transients at the McKnight household under relatively normal conditions (e.g. lights, refrigerator going, etc.) and found that the transients were much, much lower than the transients measured on the Aclara meters, such that scale had to be changed to even see them. Perhaps Mr. Smith is confusing testimony about the Bachman house?

2.6 Testimony of William Rea, M.D.

Regarding PPFF 111. PECO mischaracterizes the testimony yet again. Dr. Rea did not testify that "people who state they have EHS sometimes have the cardiovascular symptom of which Mrs. McKnight complains" but instead says that arrhythmia is seen quite frequently in patients with EHS. Dr. Rea never stated, "people who state they have EHS." In fact, he makes it clear that he does NOT base this on "people who state they have EHS" but instead confirms this himself and considered alternative causes other than EMF (Tr. 4/12 at 68:25-69:1-6). And, Dr. Rea clarifies that the arrhythmias are serious and can get to the point where is potentially even lethal! (Tr. 4/12 at 75:1-4)

Regarding PPFF 118. This is a gross exaggeration and the issue is fully detailed in the McKnight late filing (http://www.puc.state.pa.us//pcdocs/1566866.pdf) on this issue. Dr. Rea signed a mediated order after years of legal battle where he was falsely accused by Texas Medical Board (TMB). The TMB was forced to drop all charges against him (the charges listed in PECO Cross Rea Exhibit 2) except one of not providing enough informed consent on one kind of treatment, unrelated to the diagnosis of EHS. The charges were dropped because the evidence was clear that all five of the patients cited in TMB accusations not only had not harm done, but also that they were unaware that their names were even used. Every patient involved instead wrote letters strongly endorsing Dr. Rea's care including 2 of 5 strongly stating their disbelief because "Dr. Rea saved my life!"

The one remaining charge which Dr. Rea agreed to was that of not providing adequate informed consent on a few specific and uncommonly used antigens. Dr. Rea had rational for specialized use because he has a specialty practice, but agreed that he could provide better informed consent on this issue.

The mediated order does not state "his treatment modalities are not endorsed…" (implying all his treatments are questioned). Instead, it specifically allowed him to continue practice the way he always had with exception of 1 extra piece of paper which patients must sign. This piece of paper is an informed consent on a very specific and specialized treatment modality, and is unrelated to EHS.

Additionally, because of the lawsuits and the apparent abuses found in certain members of the Texas Medical Board, the Texas legislature wrote specific legislation to prevent this kind of false accusation from occurring again.

Regarding PPFF 119. The objectional patient treatment referred to in PECO Rea Cross Exhibit 2, was thrown out because that patient didn't even know his name had been used, and that patient wrote a letter of support for Dr. Rea. This case was fabricated by a few members of the TMB who had sophisticated secondary financial incentives to target people!

Regarding PPFF 120. The state of Ohio stated that they would respect whatever Texas concluded. Dr. Rea never practiced in Ohio. He did his training there nearly 50 years ago.

2.7 Testimony of Brian Uber

Regarding PPFF 128 and 129. Mr. Brocato's testimony makes it clear when and why the meter came off. Additionally, McKnight Exhibit 17 shows when the meter was transmitting, and PECO has accepted the dates on the McKnight Exhibit 5 as the dates when the meter was on and off the McKnight residence. Therefore, it is unclear why this would be considered a 'finding of fact' except to state that PECO does not keep good records of events.

Regarding PPFF 130 through 132. These are not findings of fact. PECO accepted the dates of the timeline in McKnight Exhibit 5 and even used these in PECO Cross McKnight 2. A call on October 28, 2018 is impossible since it is still in the future, but the testimony clarifies the year as 2016. And, in Proposed fact 130, they state October 18, 2016 as the first record of any complaint. However, the submitted letters to Craig Adams have dates October 6, 2016 and there was a later letter of March 16, 2017, which is not listed. And, on cross examination, it was reviewed and confirmed that Alexia did complain of the AMI meter on May 2, 2016 and this record is recorded on page 4 of PECO's Exhibit BU-1 (Tr. 4/12 at 129:9-130:19).

2.8 Testimony of Glenn Pritchard

Regarding PPFF 137 and 140. As a 'finding of fact' this statement should state 'The AMR meters are believed to transmit…' not the AMR meters transmitted. Mr. Pritchard admitted he never verified this in the field (Tr. 4/12 at 246:6-10). Therefore Mr. Pritchard's testimony is based on what he believed was occurring, not factually what was occurring. These are theoretic values, not witnessed values.

Regarding PPFF 148. The statement 'PECO's AMI meters comply with FCC regulations' is not a finding of fact on several levels. First, their license does not cover creation of unintentional conducted emissions, and if the AMI meters are transmitting at 2 watts as Mr. Pritchard testified (Tr. 4/12 at 154:25 and in PECO Exhibit GP-5) then they are well outside their FCC license as submitted in PECO Exhibit GP-12 which state they are only allowed either 1 watt or 1.32 watts, or 1.27 watts depending on which meter is used.

Regarding PPFF 149. This is not a finding of fact because Mr. Pritchard also testified that 40% of the AMR meters were of analog design (although they included a radio) (Tr. 4/12 at 149:24), but also testified to the fact that the radio of an AMI meter is significantly stronger than the radio of an AMR meter (Tr. 4/12 at 150:12; 154:25; 213:15-16; 13:21-25; PECO Exhibit GP-3, PECO Exhibit GP-5).

Regarding PPFF 150. This finding of fact is technically true, but only because no values have been quantified. Therefore, it is irrelevant. The issue is not *if* these devices generate transients, but instead, what is the magnitude of the transients, and if the magnitude is greater than the AMI meters. The only quantifiable data that compares this is the data submitted by Mr. Bathgate.

Regarding PPFF 151. This statement is not only incorrect, the late filing allowed (http://www.puc.state.pa.us//pcdocs/1567065.pdf) on the related PECO Exhibit GP-13 demonstrated that PECO did not even know how to use the "high quality Power Quality Meter" or realize the fact that the chart displayed was measuring current, and not voltage and was completely uninterpretable!

Regarding PPFF 152. As noted in our Main Brief, Mr. Pritchard never investigated the source of this 'tremendous variability' or excluded that the AMI meters were not causing the readings he saw on the HF35C. This can be a finding of fact, but it only demonstrates that Mr. Pritchard does not know how to use the HF35C meter to identify sources. If he had used it correctly then he would have attempted to systematically eliminate sources until he got a clean baseline, or would have used a spectrum analyzer as Mr. Bathgate did.

Regarding PPFF 153. Mr. Pritchard is careful with his wording 'no discernable effect' because he does not state how he determined the background level, or that the effect he was looking for was quantifiably low. Also, he did not list where this test was performed.

Regarding PPFF 161. This is not a finding of fact because it has never been measured, and Mr. Pritchard testified to the 'highly automated' nature of the system (Tr. 4/12 at 202:13-17; 167:2-3; 214:21-22; 215:11-12) which can cause unanticipated results if not checked in the field (Tr. 4/11 at 376:13-19).

2.9 Testimony of Christopher Davis, Ph.D.

Regarding PPFF 165. This last sentence "conversely, exposures below the MPE levels do not cause health effects" is not true. The FCC does set a level of MPE, but did so with full understanding that these recommendations do not contain all the factors that could be of importance in establishing a safe limit, and admits there is data that is suggestive of health effects.

In fact, the recent Duke Energy Ruling in North Carolina notes specifically that the FCC's exposure guidelines were last updated in 1996 and that the FCC has had an open docket on the question of biological impacts from exposure to those radio frequency waves that fall in the range of 300 Hz to 100 GHz since 2013. The North Carolina Utilities Commission thus concluded:

> *"No participant in this proceeding, including DEC, has asserted that customers should be precluded from opting out of having a smart meter installed. Therefore, the Commission concludes that customers should be able to opt out.*
>
> *DEC asserted, and the Public Staff agreed, that those customers who opt out should pay the incremental cost of that decision. DEC demonstrated that its proposed charges of a one-time fee of $150 followed by $11.75 per month were based on reasonable estimates of its actual incremental costs. However, the Commission is not convinced that DEC's proposal for recovering those costs would be fair to those consumers who maintain that they must avoid to the extent possible exposure to RF emissions due to impacts on their health. DEC and the Public Staff correctly stated that the FCC, not the Commission, is the*

> *appropriate regulatory body to address the health impacts of RF emissions. The Commission is aware that the FCC's exposure guidelines were last updated in 1996 and that the FCC has had an open docket on the question of biological impacts from exposure to those radio frequency waves that fall in the range of 300 Hz to 100 GHz since 2013. DEC's smart meters operate within that range, at 900 MHz; thus, the Company's decision to deploy smart meters was made in the context of this uncertain regulatory environment"(http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=5a9371bf-4f6e-4943-8b91-6e28ace9ed24 at 13 last 3 lines, and first paragraph on page 14)(emphasis added)*

North Carolina already had opt-outs, and this ruling just ensured that there will be no opt out fees for those with those with health concerns. This was specifically because decisions were made in the context of this uncertain regulatory environment. But, in Pennsylvania we apparently still need to argue to get any exception at all.

Regarding PPFF 166. It is true that AMI meters do not create ionizing radiation, however the second part of the statement is false and irrelevant because there are other methods of absorbing energy to create biologic effects, and complex biologic cascades that break bonds downstream. Please see the extensive discussion of this topic in our Main Brief starting on page 38.

Regarding PPFF 167 thru 169. See discussion of this topic in our Main Brief beginning on page 47.

These statements are not findings of fact because the computations Dr. Davis made are based on based on Mr. Pritchard's assumptions of how the meters are believed to work without field measurement, and do not properly account for the differences related to bursting effects which are considered to be more biologically active even with the same average rate or energy deposition. Even for averaged thermal effects, and without accounting for bursting effects, Dr. Davis appears to have been incorrectly dividing by 3 hours instead of the FCC's 30-minute averaging, and his computations on other matters are not reliable between testimonies (see our Main Brief section 6.2.2.5.7 and 6.2.2.5.9).

Further comparisons to the FCC MPE are irrelevant because they do not account for disease states of the patient. (see our Main Brief at section 6.2.2.5.6)

Regarding PPFF 171 thru 172. These statements are not meaningful findings of fact and simply demonstrate how Dr. Davis's numbers are incorrect. The McKnight's get no TV reception because the UHF signals are buried in background noise. However, Mr. Pritchard testified that the AMI meter transmits 4-5 times farther than the AMR meter did, and the tower gateways still do detect this above the background noise. The reason is that the burst effect of a stronger radio (transmitting less frequently under theoretic conditions) creates a period of time where the signal is much higher than noise. Biologic systems feel these burst effects as signal above noise in the very same way that the tower gateway antenna does. Dr. Davis wants to assume that a body somehow averages this energy burst over 3 hours, but that isn't the way the biology works.

Regarding PPFF 173. Dr. Davis does not have training in Medicine and only a single course Biophysics as a graduate student. When he states, "adverse biologic effects" he has no medical training to know what 'adverse' means, and has minimal understanding of what 'biologic effects' means. He therefore is not acting in an expert role here.

Regarding PPFF 174. This statement is not a finding of fact. PECO has provided no evidence to show they have an exemption. See discussion in our Main Brief on page 58, section 6.2.4.3.1. We find only that Title 47 section 15.103 provides no exemptions.

Regarding PPFF 175. Dr. Davis claims to have measured AMI meter transmissions, however field studies because of their nature explore the differences between what is 'expected' as might occur in the lab, and what is happening at a particular local site. Dr. Davis' evaluation is very vague in nature and no quantifiable values were given. However, he did not conduct these at or near the McKnight household, and Mr. Pritchard testified to mechanisms where local conditions might be affecting results because of the system automation and the dynamic nature where the system finds an 'optimal' frequency, for example. See discussion in our Main Brief at page 57, last paragraph, and please read the ancient artifact to learn how complicated systems like this behave in unexpected ways.

Regarding PPFF 176. See discussion in our Main Brief on page 58. This is a very vague study which is invalid and meaningless. Not a single quantified value was given. Dr. Davis testified that if performed at another site like the McKnight residence it would yield different results (Tr. 4/13 at 82:3-4; Tr. 4/13c at 82:3-4).

Regarding PPFF 177. Dr. Davis is not qualified as a medical expert to read these studies, and his critique makes it clear that he didn't read the Dr. Rea paper in the first place. Dr. Davis critiques the study for not providing data that is mostly clearly stated. See discussion in our Main Brief, page 37.

Regarding PPFF 178. This is not a finding of fact. See discussion of PECO proposed fact 171-2.

Regarding PPFF 179. This is not a finding of fact. The computed levels are only low if the values are computed using methods designed for continuous RF, not for burst RF. Also, this does not account for secondary antenna effect or conducted transients which make the source of RF much closer than assumed.

Regarding PPFF 180. While it is true that *some* level of harmonics and transients is unavoidable, the concern is on the quantified value of the transients of a single device (the AMI meter) which is too high in relation to those other background levels. This statement, is somewhat like saying that some smoke is 'normal' and exists regardless of cigarette smoking. It's technically true, but meaningless if the quantified value of the smoke is too high for a person with Asthma.

Regarding PPFF 181. See discussion of PECO proposed fact 171-2. This statement is not true because it again confuses a number computed using averaging effect, with a real value that occurs when the transmitter is transmitting. TV stations send continuous RF, while an AMI meter sends bursts. The bursts when they occur are quite detectable against background noise which is why the tower gateways work at all.

Regarding PPFF 182. This is not a finding of fact. It might be an opinion of Dr. Davis, but it is incorrect at several levels.

First, NIST calibration would only verify the accuracy of the power density measurement under controlled environment conditions. Even if that was the desire, the HF35C meter would not be far off assuming that proper technique was used. Mr. Bathgate testified that it is a good device for its purpose. In fact, the meter turns out to be TOO sensitive for the situation. Both Mr. Bathgate and Mr. Pritchard

testified that in front of an AMI meter it simply Peaks or over ranges the meter (Tr 4/11 at 375:14-17; Tr 4/12 at 190:9-11). Accuracy here is not possible, not because of NIST calibration, but instead because the signals are too strong and an attenuator is needed.

But more importantly, that's not what was being measured. Instead it was simply to measure qualitatively (as in yes/no) transmitting, and the quantitative measurement is the amount of time between transmissions. NIST calibration here could perhaps apply to Mr. Bathgate not using atomic clocks, but over the course of a few seconds or minutes, such accuracy is completely irrelevant. A consumer grade watch will not be off by the order of magnitudes needed to see that 7 minutes is not 3 hours.

Regarding PPFF 184. Dr. Davis is not qualified to make such a statement. Dr. Davis has no expert background in the design of power supplies or filter designs or radios as Mr. Bathgate does, and wouldn't know what to look for. And, he has minimal background in knowing what biologic effects are possible because all his training there came 'through osmosis' (Tr. 4/13 at 17:10-14; Tr. 4/13c at 17:10-14).

2.10 Testimony of Mark Israel, M.D.

Regarding PPFF 186. As noted in our Main Brief at page 29-31, Section 6.2.2.4.2, Dr. Israel has no patient experience in EHS or IEI-EMF whatsoever and has not even thought about what he might say to such a patient (Tr. 4/13 at 230:14-21; Tr. 4/13c at 230:3-10).

Regarding PPFF 187. There are several problems with Dr. Israel's review as noted in more detail in our Main Brief at page 31-3, section 6.2.2.4.3. It is not a finding of fact that "Those studies show that IEI-EMF, and the variety of symptoms attributed to it are not caused by radio frequency fields." At best this an argument from ignorance. These studies do not say 'are not caused.' They describe uncertainty in cause, and as shown by Dr. McKnight are invalid for a variety of reasons which Dr. Israel did not evaluate.

Regarding PPFF 188,190-1. See discussion in Main Brief at page 34, section 6.2.2.4.5. Dr. Israel completely ignored the event timing, and the fact that EMF and AMI meter avoidance is working for Alexia. It is not rational to refer to other specialists when the problems have already been solved (and in the case of Cardiology the patient was already seen by a specialist, and told explicitly that no further workup was required because the problem was solved).

Regarding PPFF 189. There are several issues with this obfuscated statement. First, arrhythmia is not a 'symptom' it is a 'sign.' A symptom is what the patient states or feels, a sign is what was directly observed.

Second, a pulse indicates that there is a conducted blood pressure to the periphery guaranteeing that the heart did in fact beat. While irregularity and extreme slowness checked by pulse does not indicate what caused the arrhythmia or what *kind* of arrhythmia occurred, this has nothing to do with either 'reliability' (is it a trustworthy method) or the correct wording that this is an arrhythmia (the word means literally the absence of a normal heart rhythm), or for that matter seriousness of the arrhythmia. In the setting of a person complaining of symptoms of lightheadedness and palpitations not checking a

pulse would border on malpractice, and if that pulse was found to be irregular and slow it represents a serious condition.

Taking a pulse is an extremely reliable way and first line way to determine cardiac arrhythmia. The extreme reliability of a pulse check is why it is used in triage of patients, running medical codes, determining death and more.

The fact that PECO does not know this is exactly why a utility company should not be trying to argue health facts in patients.

Regarding PPFF 192. This issue has been discussed above. See late filing sur rebuttal on this topic. Along with several other Texas physicians, Dr. Rea was falsely accused by a corrupt medical board. This case was closed in September of 2010, and did not revoke Dr. Rea's license or otherwise affect his ability to practice. In the mediation order, all charges were dropped except one minor one of need to provide better informed consent on a treatment that is unrelated to EHS or this case. Litigation showed that all 5 patients cited by the TMB had no harm done, and strongly supported Dr. Rea. More importantly, the patients did not even know that their names had been used in the false accusation. In response to the injustice, the Texas Legislature unanimously passed HB680 to prevent this from occurring again by placing additional oversights and restrictions on the medical board including term limits, the end of anonymous complaints, and allowance to record the informal settlement conferences with board officials.

Regarding PPFF 193. This is not a finding of fact. This was Dr. Rea's opinion as a cardiovascular surgeon who is very much an expert in how the heart works. He did prescribe treatment. The treatment is to avoid EMF and smart meters.

Regarding PPFF 194. See discussion on proposed finding 189.

Regarding PPFF 195. This is not a finding of fact. First, the phrase 'EHS studies' is extremely ambiguous. Second, the transcript reference does not reference Dr. L. McKnight's testimony, but instead references 1 study that Dr. Israel believed was still valid because high dropout rate didn't matter. This issue is discussed in more detail our Main Brief at page 31, section 6.2.2.4.3, including why the referenced statement of Dr. Israel is incorrect, and backed by McKnight Exhibit 14 where the American Medical Association published an entire chapter to specifically disagree strongly with Dr. Israel.

Regarding PPFF 197. This is not a finding of fact. The Lamech study (Prociuk Exhibit 3) is a case series, which is known and common experimental design and well accepted in epidemiology for a study of Prognosis (the probable outcomes of a particular disease or situation). It is a descriptive study as opposed to an experimental study. See McKnight Exhibit 6, page 3, and 4. The patients in this study were not "a population that self-identified as having EHS." In the methods of registration, there was a question "Are you hypersensitive to electromagnetic radiation from sources such as smart meters and mobile phones?" However, the study explicitly concluded "Interestingly, the vast majority of Victorian cases did not state that they had been sufferers of electromagnetic hypersensitivity syndrome (EHS) prior to exposure to the wireless meters, which points to the possibility that smart meters may have unique characteristics that lower people's threshold for symptom development." On page 31, it lists that only 8% of people considered themselves to be suffering from EHS prior to smart meter exposure.

Regarding PPFF 198. This is not a finding of fact as discussed in our Main Brief at page 17. For research purposes this may be true, but it is not true in clinical practice. The problem with EHS or IEI-EMF diagnosis is not so much that there is no diagnostic criteria or tools for this, but instead that that there is no agreement on what is included in it because the general tools may be inclusive of 2 subpopulations. Interestingly, Dr. Eltite (McKnight Cross Israel Exhibit 3) describes her tool for this, and it's mentioned in the Lamech study (Prociuk Exhibit 3). However, in our view Dr. Rea's diagnosis tooling is more definitive because it specifically checks EMF.

3 ARGUMENT

3.1 BURDEN OF PROOF

This topic is discussed in our Main Brief starting at page 15, Section 6.1.

We obviously disagree with PECO's last sentence and feel that we have clearly shown by the 'preponderance of evidence' in this case. The preponderance of evidence is clearly that Alexia was harmed by AMI meter on 2 occasions. 3 separate physicians testified to this, and alternative causes or explanations for Alexia's symptoms have been ruled out.

Further, PECO's medical expert has never examined Alexia, admits he does not know what is causing her symptoms (Tr. 4/13 at 239:4-7; Tr. 4/13c at 238:18-21) and concluded "It would be just totally inappropriate for me to try to make a suggestion" (Tr. 4/13 at 231:12-14; Tr. 4/13c at 231:2-3). PECO's other experts are not qualified to make medical opinions, and cannot evaluate the effects of medical disease states.

3.2 LEGAL TECHNICALITIES.

Independent of PECO's Main Brief, it should be clear that Dr. Davis' entire testimony and Dr. Israel's entire testimony can be questioned on technical legal grounds because his legal counsel is invalid. PECO filed motion of *pro hac vice* for Dr. Davis' counsel Mr. Watson on July 16, 2018, more than 3 months after testimony was presented!

Again, we admit that we are pro se and do not fully understand how legal technicalities work and are therefore hesitant to bring up this issue. However, as far as we can find, there is no validity to an argument that PECO's motion can be added this late. Instead, we find in rule 301:

> *"The motion for the applicant's candidacy for pro hac vice admission shall be filed by the sponsor with the clerk of the court in which or with the magisterial district judge before which the case is pending <u>at least three days prior to the appearance before the court</u> or magisterial district judge by the attorney, barrister, or advocate seeking pro hac vice admission" (https://www.pacode.com/secure/data/204/chapter71/s301.html at (b)(2)(ii))(emphasis added)*

Filing three months *after* the appearance in court is clearly not compliant with at least three days *prior* to appearance in court. We suggest that PECO's motion to file on July 16 clearly demonstrates that this motion was NOT filed earlier or that Mr. Watson was ever admitted through some other method as might be suggested by Mr. Wards testimony of some 'global' filing (Tr. 4/13, 291:14-15).

Filing this motion after the court date would appear to violate any purpose of establishing this procedure before the case is heard, and even requiring a motion in the first place. This is like "asking for forgiveness rather than permission."

Specifically, we find that the ALJ has legitimate grounds for Mr. Watsons denial based on the frequency of his work in Pennsylvania. We find in Rule 1012.1:

> *"the candidate is, in effect, practicing as a Pennsylvania attorney, in light of the nature and extent of the activities of the candidate in the Commonwealth, without complying with the Pennsylvania requirements for the admission to the bar. The court may weigh the number of other admissions to practice sought and/or obtained by the candidate from Pennsylvania courts, the question of whether or not the candidate maintains an office in Pennsylvania although the candidate is not admitted to practice in Pennsylvania courts, and other relevant factors" (https://www.pacode.com/secure/data/231/chapter1000/s1012.1.html at (e)(5))(emphasis added)*

For example, this was cited in a case an attorney Finnigan who had similar behavior in PUC v. Metropolitan Edison Company R-2016-2537349. Quoting Judge Long:

> *"While this participation lends itself to the conclusion that Attorney Finnigan has become familiar with the procedural rules of the Commission, it also calls into question the continued propriety of granting Attorney Finnigan pro hac vice admission. Pennsylvania Bar Rule 103, provides that an out-of-state attorney may be "specially admitted to the bar of this Commonwealth for purposes limited to a particular case." The rule is not intended to permit a practitioner who intends to practice in the Commonwealth on a regular basis to avoid admission to the Pennsylvania Bar. Indeed, the Pennsylvania Rules of Civil Procedure note that a court may deny a motion for admission pro hac vice where "the candidate is, in effect, practicing as a Pennsylvania attorney, in light of the nature and extent of the activities of the candidate in the Commonwealth""(emphasis added)*

Similarly, the Arkansas supreme court recently limits this practice to 3 times per year:

> *"The court shall deny the pro hac vice motion of a non-resident attorney when the non-resident attorney has participated, served as counsel, or entered an appearance pro hac vice in three (3) cases in the State of Arkansas during the twelve months prior to the filing of the motion." (see http://www.mitchellwilliamslaw.com/webfiles/Per%20Curiam%202016%20Ark_%20354%20Pro%20Hac%20Practice.pdf at 3: item (f) and https://www.americanbar.org/groups/litigation/publications/litigation-news/top-stories/2017/pro-hac-vice-rule-increases-scrutiny-of-non-resident-lawyers.html) (emphasis added)*

Pro hac vice means 'for this occasion', not 'any time you please.'

PECO's motion itself suggests at least 6 recent cases of non-resident participation where Mr. Watson has served as counsel and at least 2 additional others beyond our case of his participation without prior grant of *pro hac vice* (ours the 3rd instance for a total of 9 just for Mr. Smith and PECO). This is not even

inclusive of numerous (perhaps 20 or so) additional cases where Mr. Watson has either acted as counsel or has applied for *pro hac vice* in other Pennsylvania cases such as in the PPL districts in 2017-18. This repeated participation can easily be seen as an abuse of the *pro hac vice* system.

These many admissions indicate a near full-time operation. One wonders when or if Mr. Watson ever gets back to his home state to practice there.

Nunc pro tunc then sets very bad precedent because it forces the ALJ to confound other decisions and events that occurred during the proceedings against decisions that might be made in regarding the *pro hac vice*, and places additional pressure for the ALJ to rule in particular ways on the *pro hac vice* because of issues unrelated.

PECO argues (item 9) that the docket is still open. But, according to § 5.431 the record is closed:

> *"(a) The record will be closed at the conclusion of the hearing unless otherwise directed by the presiding officer or the Commission.*
>
> *(b) After the record is closed, additional matter may not be relied upon or accepted into the record unless allowed for good cause shown by the presiding officer or the Commission upon motion."*
> *(https://www.pacode.com/secure/data/052/chapter5/s5.431.html)*

So, at best this would be reopening the record. But further, the referenced testimony of both Dr. Davis and Israel where Mr. Watson acted was shared with the Bachman's case (C-2017-2623504) which was apparently settled, which would imply that at minimum that docket is closed (see http://www.puc.state.pa.us//pcdocs/1573117.pdf) and was closed without this *pro hac vice* admission. The testimony and counsel Mr. Watson provided may have been influential in the Bachmann's decision to settle.

And, in our case, this would confound with testimony that the ALJ has already heard to potentially change fact finding or weight.

That potential for dramatic change in the way the trial has proceeded, with no way for PECO to address the situation by for example finding a substitute Pennsylvania legal representation would at minimum create a perception of impropriety that the case was decided on technical legal grounds rather than on the substance merits of the case. But also, this situation creates un-natural pressure on the ALJ to ignore the *pro hac vice* abuses, and thus creates perception of impropriety that the ALJ is not appropriately addressing these. If the ALJ is to rule consistently, since the omission is not an isolated issue of a single case but involving at least 3 cases, it confounds those decisions as well and would require reopening multiple records, and continued block of the ALJ to address a separate issue of what appears to be an abuse of the system. This is a bad slippery slope.

PECO sites prior cases of *nunc pro tunc*, however these cases appear at best to be extremely rare, and seem to be in very different situations where the admission or denial would have material changed a decision. In Varner v. Roberts 1988 (https://www.leagle.com/decision/198816547padampc3d1181143) the pro hac vice occurred on November 2, 1987 before the arguments were heard December 17, 1987, and the late filing was with respect to preliminary objections. Similarly, in Duquesne Light v. PUC 2006

(Docket R-00061346) the case looks to have been dismissed for failure to prosecute, and it is not clear if the admission had any impact to relevant testimony.

Similar cases in other states have been questions up to high courts and have resulted in invalidation and voiding of the judgements. For example, Hadley v. Pike, 2014-Ohio-3310 (http://www.supremecourt.ohio.gov/rod/docs/pdf/7/2014/2014-ohio-3310.pdf) where a Pennsylvania lawyer applied for *pro hac vice* in Ohio 2 weeks late.

We argue therefore the PECO's motion for *nunc pro tunc pro hac vice* should be denied with consequence of impact on the testimony given both Dr. Davis' and Dr. Israel.

3.3 HEALTH TESTIMONY

3.3.1 Dr. Alexia McKnight's Testimony

PECO's argument in this section is apparently that Alexia did not show by 'preponderance of evidence' that she had the "Cardiovascular Symptom" during the time periods of the AMI meter installation or that they believe that the Nocebo effect is the cause (PECO Main Brief at 41:6-9).

Of note, PECO almost completely ignores all of Alexia's other symptoms such as severe and unusual headaches, severe and unusual insomnia, depression, memory problems, and a sense of not 'being able to be in my own house' (Tr. 4/10 at 10:2-15) which all also occurred in the same temporal association with the AMI meter and were also witnessed by Dr. L. McKnight (Tr. 4/10 at 83:9; 84:8; 84:21), and which have been noted in case series by high frequency association with smart meters elsewhere (Prociuk Exhibit 3 at page 31, Figure 2).

They acknowledge this only on the bottom of page 40 for the May 9, entry where they state, "Mrs. McKnight felt better" which mischaracterizes her statement "isn't *quite* as uncomfortable, not sure why. A *bit* less headaches, and less heart palpitations." In other words, she had a marginally better single day in a 6-month period of continual symptoms! She didn't state that she believed the meter was removed, but stated 'not sure why.' Further, based on Mr. Pritchard's description, it is entirely possible that the AMI meter was reprogrammed because it is 'highly automated' (Tr. 4/12 at 215:11-12) and this tuning is done remotely (Tr. 4/12 at 214:21-22). Even PECO would not know if the AMI meter was reprogrammed or not on May 9. Even if not, this hardly disputes the fact that she felt miserable for months while the meter was on the house.

The arguments that Dr. Davis' states higher exposures from other sources or are higher in the sailboat are refuted more thoroughly in our Main Brief, but are incorrect primarily because Dr. Davis completely ignored the effects of bursting in his analysis (McKnight Main Brief at section 6.2.2.5.7).

But, it is true that Alexia also experienced arrhythmias (Tr. 4/10 at 71:12-16) during the periods when the AMI meter was on the house which were also directly observed by Dr. L. McKnight (Tr. 4/10 at 126:20-22). Of all the symptoms and signs that Alexia had, arrhythmia perhaps stands out because:

1) Alexia never had this before the AMI installation (Tr. 4/10 at 12:11).
2) Alexia had this with both AMI installations (Tr. 4/10 at 12:6; 13:17).
3) Alexia sought medical treatment for this, and her history and actions were documented (PECO Cross McKnight Exhibit 1).

4) The arrhythmias resolved after the AMI meter was removed on May 24, 2016 (Tr. 4/10 at 12:24) and did not recur until reinstallation in early September.
5) The arrhythmias did recur after reinstallation in September, and resolved again after the AMI meter was removed on Nov 1, 2016 and have not recurred since (Tr. 4/10 at 15:8).
6) Alexia has no known reason to have arrhythmias (PECO Cross McKnight Exhibit 1). Even Dr. Israel states she is at low risk for such an event (Tr. 4/13 at 214:7-11; Tr. 4/13c at 213:21-214:3)
7) Arrhythmias can be serious (Tr. 4/12 at 75:2-4; Tr. 4/10 at 129:3-5).
8) Arrhythmias are noted to be in association with EHS exacerbation (Tr. 4/12 at 70:4).

As discussed above at 'Regarding PPFF 6', this PECO's rewording to 'cardiovascular symptom' is a weak attempt to obfuscate the facts and reflects their poor medical understanding of this issue.

Arrhythmia is a general term to indicate that the heart rhythm is not normal. It is not known exactly what kind of arrhythmia Alexia had, but is clear that she had an arrhythmia and that it was significant.

Dr. Saleem stated that this may have been from premature beats (VPC's and APC's). Occasional premature beats (VPC's and APC's) are a type of arrhythmia, are insignificant (Tr. 4/11 at 48:17-19) and considered normal. However, if the arrhythmias were VPC's or APC's, the frequency at which Alexia described them "I was having more skipped beats than beating beats" (Tr. 4/10 at 12:13-14) makes them abnormal and very significant (Tr. 4/11 at 300:1-3; Tr. 4/12 at 75:2-4). Runs of VPC's can trigger other forms of arrhythmia, and at rates of VPC's occurring above 30 times/hour are a marker for sudden cardiac death. A physician (like the author of this brief) knows this, but in this case, a lawyer at a utility company apparently is confused on the topic, and may not understand why or how this becomes important or the medical issues of why or when to refer a patient. So, PECO seems to question why Dr. Rea can make his statement "They can kill you… And I think she was very lucky that she didn't die when she had it" (Tr. 4/12 at 75:2-4) PPFF 115, and yet why he did not prescribe treatment PPFF 193.

The reason is because in Alexia's history she described a situation that put her at high risk for sudden death, however at the time she saw Dr. Rea that situation was resolved. When she saw Dr. Rea, she was no longer having "more skipped beats than beating beats," therefore there was no need to prescribe or do anything different. Dr. Saleem noted a rate of about 35 VPC's in 24 hours. The treatment of avoidance was working as he had seen in many other similar patients (Tr. 4/12 at 76:10-17). But during a time when she complained of having "more skipped beats than beating beats" this is a risk for sudden death.

To understand this requires medical knowledge and understanding of patient events and timing. Yet another reason why we argued in our Main Brief that a utility company is poorly positioned to be making medical judgements, and why a courtroom or legal briefs is an inappropriate place for discussions about complicated medical subjects.

However, if there might be doubt that Dr. Rea didn't just 'make this up,' or to help in deciding that one side might be presenting an argument 'more convincing, even by the smallest degree', consider Alexia's statement "I was having more skipped beats than beating beats" against the meta-analysis (https://www.ajconline.org/article/S0002-9149(13)01290-3/fulltext) that reviewed eleven studies comprising a total of 106,195 participants that supports the claim that VPC's at more than 30 per hour is in fact a significant independent risk for cardiac death. This is why high numbers of VPC's observed during period when the AMI Meter was on the house, and when Alexia was having additional symptoms

of lightheadedness are a serious medical matter (Tr. 4/11 at 304:16-18) and grossly different from an observation during a period when the AMI meter was off, when Alexia was not complaining of symptoms, and noted to be occurring at a normal infrequent rate, thus "relatively benign" (Tr. 4/11 at 277:20).

To also understand why a utility company is poorly positioned to interpret medical studies, consider for example the review article at (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2922873) which outlines the medical subject inclusive of why Dr. Saleem would even order an Echocardiogram (Echo). PECO only describes this as 'the second cardiac test on May 27, 2016' (PECO Main Brief at 44 second paragraph) arguing that it showed Alexia never had any arrhythmias as if all cardiac tests have the same purpose of only determining the issue of heart rhythm directly.

The Echo of May 27 was ordered to look for *structural heart disease* as a possible explanation of the arrhythmia. The significance of the Echo is that it is negative, and therefore suggestive of a primary arrhythmia (for example not one caused by vascular disease that might cause a region of muscle contracting differently on the echocardiogram, or an abnormally large chamber size that might affect the conduction pathway, or generally decreased cardiac output that might indicate another cardiomyopathy). The report of an Echocardiogram would not typically report if arrhythmia is occurring, and certainly would never rule out that arrhythmias were not occurring. So, PECO's argument that because this is negative only 3 days after AMI meter removal just shows they don't have a clue why it was even ordered.

The workup of an arrhythmia is complicated by the fact that abnormal rhythm may be transient in nature where the heart beats regularly for a period of time, but occasionally has periods of irregularity. Consider Figure 1 of in the article, for example. *If* an arrhythmia is captured on an EKG then it helps to determine the more definitive source and nature of arrhythmia. However, because arrhythmias are often transient it is quite typical that the EKG can be normal even while the patient is having significant problems (e.g. Tr. 4/10 at 70:18-23). A typical 12 lead EKG as shows about 10 seconds worth of activity. So, any single EKG has only about an 8% chance of even noting a VPC (e.g. a 92% chance of being normal), assuming that VPC rate was occurring at a significant rate of 30 per hour. Since the VPC's often occur in runs, it's even less than 8%. Like an Echocardiogram, an EKG would be done in this case to look for other known explanation, which Alexia did not have. An EKG is helpful if it shows a known cause such as evidence of ischemia, conduction delay, or by chance captures the arrhythmia. But, a normal EKG does not rule out arrhythmia because it is only a very small sample of time. The appropriate test to do is therefore a 'Holter monitor' – the study done on June 13 – a month later, and when Alexia's symptoms had resolved *because* the AMI meter was removed.

A Holter monitor is a portable device to record the heart over a longer period such as 24 hours. Because of the transient nature of arrhythmias, even this 24-hour period is often insufficient and in this case another device called an implantable loop recorder can be required. But, the Holter study is the only relevant study to medically quote. It was negative *because* it was a month after the problem was solved by removal of the AMI meter.

PECO's conclusion that this is a nocebo (PECO Main Brief at 41:6-9) is speculation on the part of an attorney with no medical training and is refuted in several places of the testimony by the Medical experts. Nocebo effect is generally not known to cause arrhythmia. But, also as a more general explanation of symptoms Dr. L. McKnight specifically considered this and rejected this diagnosis (Tr.

4/10 at 124:16-20; 128:23-25). Dr. Rea did as well (Tr. 4/12 at 69:1-6). Even Dr. Israel refused to attribute this cause (Tr. 4/13c at 224:9-22). Instead, Dr. Israel stated he did not know (Tr. 4/13 at 239:4-7; 4/13c at 238:18-21).

And, Alexia testified that she had arrhythmia BEFORE she knew of the AMI meter re-installation in September 2016. The re-occurrence of her arrhythmia was the clue of why she became suspicious to look for this (Tr. 4/10 at 13:17-20). That argues against Nocebo.

It appears that PECO is attempting to assert that Alexia made up her "Cardiovascular Symptom." For example, on page 40 of their Main Brief PECO states "they all showed that Mrs. McKnight is not suffering from the Cardiovascular Symptom." This begs an important question –does PECO really believe Alexia made this up, and if so what evidence have they provided to support this accusation? The evidence they provide is that a utility company does not even know what the cardiovascular tests are for. It shows that they are incompetent to make medical judgements in general, and therefore they should consider that a letter from a treating physician is generally a better way to determine health issues in patients.

Alternatively, how does PECO explain the testimony that Alexia, a Doctor of Veterinary Medicine, checked her pulse and found it significantly irregular (Tr. 4/10 at 70:24-71:6), and noted this on multiple occasions (Tr. 4/10 at 13:7; 25:11-18). And, how does PECO explain how she confirmed this with her husband – a licensed, board certified, and practicing physician – who also find her pulse significantly irregular and testify to that fact (Tr. 4/10 at 126:20-22). And, why did she take time off to seek medical care for this (PECO Cross McKnight Exhibit 1).

We respectfully submit that Alexia didn't make this up, and the McKnight's along with Alexia's treating physicians are sincerely and legitimately concerned about her safety!

3.3.2 Dr. Lawrence McKnight's Testimony

Dr. McKnight was qualified as a medical expert, and specifically with expertise on how to make diagnoses, how to interpret medical records, and how to interpret scientific research publications (Tr. 4/10 at 96:7). He testified that it is beyond reasonable medical certainty that the AMI meter was causal for Alexia's symptoms (Tr. 4/10 at 128:7-17).

PECO argues that Dr. L McKnight did not provide testimony to support the theories of transients or secondary effects (PECO Main Brief at page 41). But, Dr. L. McKnight also testified that he did not need to (Tr. 4/10 at 130:15-21). Instead, he testified that clarity of mechanism is not required to make medical decisions when a proximal cause has been identified. This is because there may be many intermediates involved, and they may be co-occurring or synergistic. For example, he cited the cigarette-cancer link as a common example where all exact chemical mechanisms are still not known, but the proximal cause is, and therefore we avoid the proximal cause (Tr. 4/10 at 130:7-14, McKnight Exhibit 11).

The concern over the 3 potential mechanisms is based on what an AMI meter can do, and this testimony is provided by Mr. Bathgate. But, in the absence of knowing which mechanisms are playing a role or if all mechanisms are contributing, the only solution is to fall back to known safe situations of which there seem to be two 1) the continued use of a jumper plate with indefinite estimation (which has been known to work for the last year; or 2) use an old fashion analog meter which Dr. Rea has seen work in

other cases. Not knowing which mechanisms are involved just makes PECO's accommodation more challenging.

PECO perhaps argues that Dr. L. McKnight did not establish a separate medical concern for conducted emissions as opposed to RF. This is addressed in known facts of physics, and the definition of an antenna. Any wire carrying an alternating voltage (e.g. a conducted emission) creates an electromagnetic field effect around that wire, and this is all an antenna even is (e.g. https://en.wikipedia.org/wiki/Antenna_(radio) "an antenna is the interface between radio waves propagating through space and electric currents moving in metal conductors"). These EMF effects around wiring are also easily demonstrated in a plethora of ways ranging from the more sophisticated tests with specialized antennas and spectrum analysis to simply waving an old AM radio next to household wiring, or even standing next to an electrical outlet (within a few feet) and holding one lead of an AC voltmeter, where the other lead is grounded (because the electric field of the 60 cycle AC radiates several feet away).

There is no difference from a medical point of view how the EMF gets generated by its primary antenna versus through some other another wire. The only difference in this case perhaps is that the frequencies of transients are irregular and at a lower frequency than the 901Mhz radio, the proximity to the 'antenna' is different, and the harmonics related to the length of the wire is different. One is a small wire in the meter itself and tends to be more predictable, while the other is wire in the floor or wall of a house and less predictable. We do not know which wire caused, nor the frequency of RF on that wire, but we do know the biologic effects start with AMI meter installation, and end with AMI meter removal.

PECO claims that "As to Mr. McKnight's views on Type II errors and false negatives, it is enough to say Mr. McKnight clearly is an outlier in this theory" (PECO Main Brief at 42 second paragraph).

PECO's statement that Dr. McKnight's opinion is an 'outlier' is a completely unsupported assertion. And, even if were true, it would not matter. The truth of arguments is not determined through popularity contests.

However, his views are not 'outlier' opinions.

The methods Dr. McKnight used in his review are explicitly described (McKnight Exhibit 14) and are published by the American Medical Association. As of 2014 more than half of medical schools have measurable learning objectives targeted to these techniques (e.g. see https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4076124/). Dr. Israel is probably less familiar with these techniques because the formality to these techniques was introduced after he completed his residency, and they may not have been formally taught where he practiced. However, they are more strongly emphasized at some institutions than others, and were strongly emphasized at the Mayo Clinic and Columbia University where Dr. L. McKnight trained, and further emphasized in the Clinical Informatics boards, which is probably why Dr. L. McKnight is so much more familiar with them. He was qualified as an expert specifically in this field (Tr. 4/10 at 96:3-6).

Of note, PECO does not attempt to argue to show how Dr. L. McKnight's analysis is wrong or incorrect. This because it isn't wrong, and because it's clear that Dr. McKnight makes sense when he argues his points. Human subjects are ethically required to have capacity to quit or not participate in medical studies; studies that test only for harm, and do not provide therapy are called 'studies of harm'; subjects are generally reluctant to volunteer for studies that only involve inducing pain or otherwise causing

harm; and subjects that already associate an exposure with harm because they have experienced an association in the past are far less likely to participate in a study with no apparent benefit to them. This creates a natural bias which is called 'spectrum bias', and this is an important kind of type II error (McKnight Exhibit 6 at page 5). These are not outlier opinions. Common sense would tell a rational person that this is all true. And, this is well documented (McKnight Exhibit 14).

Instead PECO's only argument here is a weak appeal to authority. They do not consider a larger medical community that does not normally follow this subspecialty area interest. Also, PECO's argument presumes that the WHO is infallible, and its statements can never be questioned. The fact that governmental and public health agencies are indeed fallible has been shown time and time again (see McKnight Exhibit 6 at page 10). This doesn't imply that Dr. McKnight believes that WHO is a bad organization. It just means that he believes they can and do make mistakes just like anybody else. And, they are subject to verification, and Dr. McKnight is an expert in how to do this.

The WHO is an international public health organization. It is not the whole of the international opinion on any medical subject, and executes its work in small committees. It has no authority over other medical boards and isn't a place where medical controversies are officially judged or arbitrated. And, sometimes even those internal groups within the WHO don't agree - as evidenced by the fact that the IARC (another subgroup of the WHO) has classified cell phones as potentially carcinogenic.

In this case Dr. McKnight's literature review demonstrated that apparently the small number of committee members that generated this report (McKnight Exhibit 15) overlooked an important issue. Indeed, it can be shown that the recommendations from this small WHO group is an 'outlier.' This is demonstrated by the fact that causality for every other disease in Medicine has been established differently. There is good reason why Dr. Israel did not know the answer to the question "Do you know of any other blinded provocation studies that have established causality of diseases" (Tr. 4/13 at 243:4-7; Tr. 4/13c at 242:8-10). IEI is unique because it is only condition where the randomized control trials of blinded provocation in humans has ever been given significant weight.

This probably occurred mainly because it relied almost exclusively on a very limited number of authors and review papers. In particular a single Ph.D. – Dr. Rubin and 2 others did a systematic review (McKnight Exhibit 7) and later an update (McKnight Exhibit 9), which had conclusions that formed the foundation of the mistakes. It's an easy thing for a busy committee member to miss this sort of thing because to catch the mistake would have required going back and careful thought and subsequent review of each paper according to methods that are well accepted, but time consuming to do properly. That Dr. Israel missed this is the same reason. Dr. Israel likely has a lot of other concerns running cancer centers, and if and when he reads the literature he likely skims over it and jumps to the authors conclusions section and moves on to the next article. Such reading will not catch the errors, and this became clear on his cross exam.

Additionally, it is easy for a person that isn't formally trained in informatics or evidence based medicine techniques to be confused and think that a "Double Blinded Randomized Control Trial" (RCT) might be of higher quality design. It is true that in general RCT's and systematic reviews tend to be a higher level of evidence, and that experimental designs are more trusted (McKnight Exhibit 6 at page 2-3). Further, double blinding is a good technique to avoid placebo confounding. However, these are generalizations and other aspects of the study design need to be considered also. In particular, it matters greatly what type of question is being asked to know if an RCT is applicable. RCT's are NOT appropriate for studies of

harm in humans. A few people missed this important detail and this literature just got misinterpreted and over emphasized. This is very easy to do.

But, Dr. L. McKnight didn't make this up, and again, it isn't an outlier opinion. It's listed on page 303 of the JAMA users guide (McKnight Exhibit 14):

> *"There are 4 reasons why RCT's may not be helpful for determining whether a putative harmful agent has deleterious effects. First we may consider it unethical to randomize patients to exposures that might result in harmful effects without benefit (e.g. smoking). …"*

People come to doctors to get help (therapy). People don't come to the doctor's office to get harm. RCT's are great for studies of Therapy because there is incentive for a sick patient to want to get something that might help. So, the study population will more closely match patients coming to see physicians. RCT's for therapy need to be watched closely for drop outs, but appropriately designed this study design is quite good. But, a label 'Randomized' in the title doesn't mean that the study actually is appropriately randomized, and in a pure a study of harm in humans the randomization is broken before the study is even started.

Yet, a randomized study of harm in humans is exactly Dr. Rubin's argument that convinced the WHO in in McKnight Exhibit 15. Rubin argued

> *"The best way to determine this is to examine the results of blind and double-blind experimental provocation studies." (McKnight Exhibit 7 at 224, second column line 4),*

Notice – no therapy. No benefits of provocation. Just potential for harm. And, the WHO report (McKnight Exhibit 15) used this to conclude "Provocation studies are considered to be the most powerful way of studying/ proving a causal relationship," and "epidemiology studies are not considered helpful."

No other establishment of causality in human medicine has ever followed these rules.

We never determined that asbestos caused cancer by experimental studies where patients volunteered to be exposed to asbestos, nor do we claim that such a link does not exist because these studies were not performed.

We never established that myocardial infarction can causes chest pain by patients volunteering for cardiac ischemia.

We don't claim that Migraine headaches don't exist or cannot be triggered by foods or activities. Randomized control trials of blinded provocation were not used to establish that Migraines can be caused by exercise or foods. Nocebo could theoretically be playing a role here too. But nobody is claiming that exercise induced migraine isn't real.

This list could go on and on for every medical disease. IEI-EMF is the outlier. There is nothing else in medicine like this. Even Dr. Davis points out how it is very unusual to use this design in human medicine (Tr. 4/13 at 114:20-21; Tr. 4/13c at 114:14-15)

Again, the reason is because the randomization process is not valid. With the volunteer effect and no volunteer incentive, the population under study has a natural skew where patients that have disease tend to not volunteer at the same rate as more healthy subjects – the 'spectrum bias.' Also, because skew in the spectrum bias is asymmetric, a positive study can have some validity, but a 'negative' study does not have any validity. Any 'negative' result can be immediately explained by the spectrum bias alone, and thus any interpretation of the results has been confounded. Under these circumstances, the only interpretation of a negative result is that it is an 'invalid' study.

Invalid studies do not support any conclusion because they represent a type of 'appeal to ignorance' (McKnight Exhibit 6 at page 7). They represent uncertainty. Logically, combining any number of studies that show uncertainty can only yield uncertainty.

So, while it may seem as if the negative studies add weight to the scientific evidence, the fact is that under these conditions the negative studies do not add any weight at all. Many clinicians can and have been confused by this. But this is not a light opinion of a random physician who came to a different opinion as another physician. This is a mathematically provable fact, and why the medical societies such as the American Medical Association realized that specific training was needed here and generated the book referenced in McKnight Exhibit 14. It's not rocket science, but it may take some thinking before people come to understand it because it's not always intuitively obvious how the statistics works.

Interestingly, however, combining any uncertainty with a positive assertion does result in a positive assertion (McKnight Exhibit 6 at page 6). And because the skew of a spectrum bias is asymmetric, positive studies of this type are very rare, but if positive, it *can* be interpreted because the spectrum bias skew results in a distribution that makes it extremely specific at the cost of any sensitivity. Think of this skew like moving the tail over between 'preponderance of evidence' and 'beyond a shadow of a doubt.' In fact, legal burden and diagnostic testing share a similar statistical framework as noted in McKnight Exhibit 6 slides 5 and 9.

The effective result is that, because of intrinsic properties of these studies, 'negative' always conclude with uncertainty, but 'positive' results do not. Combining any number of studies showing uncertainty will only yield uncertainty. However, combining even 1 positive study to the uncertainty, results in a positive overall conclusion (McKnight Exhibit 6 at page 6). This principle seems to have analogy in the legal hearsay rules. It's like combining hearsay (the uncertain studies) against other objective facts (the certain studies).

Dr. McKnight pointed out at least 2 positive studies of this type (Rea and McCarty), thus confirming the association of EMF as the cause of EHS.

There are also many other studies (several thousand) on the topic of EMF and biologic effect more generally. These are of various designs such as cohort studies, animal studies, or in-vitro studies. In general, these other designs may have other problems and false positives and thus taken alone may not establish causality. And there are positive and negative studies here too. Taken in sum a combination of many studies of various designs is typically the way all other causality has been established in medicine. There can be legitimate debate over if there is enough here to establish causality, but there likely is on this alone and others such as Dr. Pall have asserted as such. But because of the unusual test characteristic of the provocation study of harm in human, having now 2 of these studies show positive, makes it absolutely clear. There are undoubtedly are people that are unusually sensitive to EMF. EHS

exists. No question. The McCarty study acts like a smoking gun with matching fingerprints because it is so difficult to get a study like this in the first place.

And, that's even before and independent of events related to Alexia.

Another way of looking at this is to ask, 'what direct evidence is there to support the statement that EHS is not caused by EMF' (e.g. PECO's argument).

Proportionately, the 47 studies cited by Rubin are an extremely small amount of literature where there are several thousand studies. And the 47 studies cited by Rubin are TINY studies. Rubin admits the median study size of the papers was 19 participants, and significant problems with recruitment (McKnight Exhibit 9 at page 8 under the section 'quality of the evidence'). Beyond all the other problems with this body of literature, The JAMA users guide specifically warns:

> *"Systematic reviews based on a small number of studies with limited total sample sizes are particularly susceptible to publication bias, especially if most or all the studies have been sponsored by a commercial entity with a vested interest in the results." (JAMA Users guide, 3rd Ed at 465 top of 2nd column)*

And, close examination of the small studies does show a very high percentage with industry funding, as do the Rubin systematic reviews themselves. So, suppose the 2 papers by Rubin are removed, because they turned out to be invalid, then ask the question. Does the WHO reference (or any of the cited authority references) still hold, or does the authority base its recommendation in large part because of specific reference to Rubin's paper? What other original studies support a statement 'EHS is not caused by EMF?' Or even that the therapy of CBT has been successful for IEI-EMF? That's what Dr. L. McKnight did. There is scant any other evidence. These arguments all fall apart by removal of 2 papers authored by a Dr. Rubin. Close analysis of those papers by any serious look will find that that they have subtle but grave mistakes. The weight of the evidence is clearly that EHS can be and is caused by EMF in some cases. Nocebo may still explain some cases or even many cases of IEI-EMF, but it is not the exclusive cause.

Interestingly, it was this same kind of analysis that recently created the huge swing in opinion about the safety of Opioids. For years, physicians have been told that opioids were not addictive to patients without additive personalities, and were very safe so doctors should be more aggressive in treating pain and use these medications. Later it was discovered that this practice can be traced back to a single 1-paragraph letter to the editors of the New England Journal of Medicine that challenged the practice of using opioids only for relief of acute pain. It turned out this letter was referenced over 600 times and dramatically changing opinions over opioid use (e.g. see https://www.nejm.org/doi/10.1056/NEJMc1700150?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub%3Dwww.ncbi.nlm.nih.gov&). This included recommendations from the WHO (see https://www.mayoclinicproceedings.org/article/S0025-6196(17)30923-0/pdf at 345). See the figure on the same page to understand that despite good intentions, the WHO can sometimes be fallible.

Without the invalid studies noted by Dr. Rubin, there would be ample evidence to show this disease. However, the fact that many clinicians and medical researchers are not trained on to appropriately read and interpret studies is the reason why the American Medical Association, the British Medical Journal,

and several other groups have published explicit methods to train physicians like Dr. L. McKnight to catch these kinds of errors. But, the errors do still creep in because many clinicians have been trained in an era before these methods were taught in medical schools and residency. Unfortunately, this creates a situation where physicians can be misled into inappropriate weighting of these invalid studies. It appears this is what happened in the case of EHS.

Further, reading many of the randomized provocation studies in details finds that there are other major problems. While most of these studies may be reported 'negative' most also reported patients tend to drop outs. When this happens, it is not clear why the patient dropped out, and thus the study can only be reported as invalid and neither supporting or rejecting any null hypothesis. However, many of the studies give hints and clues that the patients drop out in disproportionate numbers during real EMF exposures, or invalid sham conditions. So, these studies would likely have become positive if the subject did not have a volunteer option to drop out, or if the sham was properly executed.

There is significant financial support from the telecom industry and military to promulgate these studies because it is of significant economic benefit to the telecom industry if there is doubt about EHS being caused by EMF. This does not necessarily imply conspiracy. These are good, honest people. But, this group is less likely to look hard and deep in directions that don't favor their interest, and much more willing to challenge more stringent restrictions that are not in their interest. For example, if challenged by a patient saying stating they are sensitive to EMF, they are much more likely to say, "prove it - beyond shadow of a doubt" as opposed to 'ok, let's be on the safe side here.' And, industry tends to support groups that get the results they like to see (like doing another small double blinded randomized provocation studies), even when they do not make any overt threats to force them to only publish certain results. They know what the results will be before the study is done.

Next, PECO's assertion "…the World Health Organization supports the view that EHS is not caused by radiofrequency fields" is actually a mischaracterization. The WHO is careful and never states 'not caused by.' It said it did not have enough evidence to know. For example, in the name change preferred by Dr. Israel and Davis, the WHO writes in 2006 (now 12 years ago):

> *"The term Idiopathic environmental intolerance (Electromagnetic field attributed symptoms), or IEI-EMF, is proposed to replace terms that imply an established causal relationship between symptoms and electromagnetic fields (e.g. electromagnetic hypersensitivity, electrosensitivity and hypersensitivity to electricity). Should a causal relationship to EMF or any other explanation be established in the future, the name of this condition may be changed according to this new knowledge." (McKnight Exhibit 15 at page 16) (emphasis added).*

In other words, the WHO did not, and does not rule out that a causal relationship to EMF could be established, they only wish to emphasize they just don't know. But, for example, it does not preclude that they may have missed something or that a future study such as McCarty that might come along to change this.

Finally, PECO argues Dr. McKnight's experience of his wife do not matter. They misconstrue the significance of the Florida incident, and misunderstand how a physician concludes a medical certainty.

The Florida incident is not significant because it established that the experiment was blinded. It was significant because the words Alexia stated were incompatible with the way a Nocebo effect works (See. Regarding PPFF 49 and Tr. 4/10 at 197:7-10). This vividness is because Dr. L. McKnight realized that a Nocebo effect is triggered and amplified by a thought that there is something causing the harm, but Lexi's question indicated that she was not thinking about something causing the harm, but instead thinking about a question that she didn't know what made the harm go away. Nocebo simply can't do this because its incompatible with what a Nocebo even is. It was also vivid because that is when Dr. L. McKnight realized that if there were patients where Nocebo was not causing this, then the WHO's evaluation and recommendation was wrong, and he questioned if he needed to verify to see if or how they could have made a such a mistake. On that review he found that the literature that they cited did had significant problems and was over dependent on a poorly done systematic review of several very small and poor-quality studies.

Dr. L. McKnight's other experiences with his wife matter, not because of any established blinding, but instead because of the combination of hundreds of small clues each increase an end probability. This process is described in the JAMA users guide (McKnight Exhibit 14) starting at Chapter 16, the process of Diagnosis at page 330. There are nearly 70 pages of relevant text and mathematic formalism in this reference, but to quote a small piece

> *"Clinical diagnosis is a dynamic process. As new information arrives, it may increase or decrease the probability of a target condition or diagnosis. For instance, in the older man with involuntary weight loss, the presence of a recent major life event (his wife's death) raises the likelihood that depression is the cause, whereas the absence of localizing gut symptoms decreases the likelihood of an intestinal disorder. Likelihood ratios capture the extent to which new pieces of information revise probabilities" (Users' Guides to the Medical Literature, 3rd edition at page 332)*

The intuitively understandable part of this is simply that each part of the history (including every life event Dr. L. McKnight experienced with Alexia, inclusive everything from her character to random 'weird' apparently unexplainable predictions) is 'new information arriving' and each piece either increases or decreases the probability of a target condition (e.g. EHS from EMF, Nocebo effect or something else). These are not formal likelihoods, but much like the example in the User's Guide where a clinician is evaluating an old man with a recent major life event and inching up the probability of depression because 'that fits', or decreasing the probability of an intestinal disorder because it doesn't fit as well without symptoms in the gut. So, even minor events that by themselves are not diagnostic change the probabilities, and these likelihood ratios multiply overtime. This process has been well described (e.g. https://en.wikipedia.org/wiki/Likelihood_ratios_in_diagnostic_testing) in countless places, and has formal mathematic underpinnings.

Dr. L. McKnight has more 'new information arriving' than the other medical experts because he lives with Alexia day to day. And, in addition to being recognized as being able to know how to make medical diagnosis in general, it is became clear in testimony that despite any formal recognition as an expert in EHS, he clearly knows far more about this syndrome than Dr. Israel does and meets all the qualifications of an expert in this disease according to rule 702 (https://www.pacode.com/secure/data/225/chapter7/s702.html).

Dr. L. McKnight can make a statement of "beyond reasonable medical certainty" (Tr. 4/10 at 128:7-17) and even "more like 95% certain" (Tr. 4/10 at 197:25) because he has witnessed so many events each of which has a small likelihood ratio, but when multiplied together combine to make a large shift in the post test probability.

Notably, this is also the reason why Dr. Israel testified he cannot do the same. He clearly articulated this in his statement:

> *"You know, I know a millionth of 1% of your life. I've never even examined you or your wife. It would be just totally inappropriate for me to try to make a suggestion for what you should do" (Tr. 4/13 at 231:12-14; Tr 4/13c at 230:25-231:3).*

3.3.3 Dr. Prociuk's Testimony

PECO argues that Dr. Prociuk's opinion should be given little weight because he is not an expert in EHS. This is ironic because Dr. Israel was not recognized as an expert in EHS either. The only expert in EHS is Dr. Rea. But, at least Dr. Prociuk has examined Alexia and knows her history well.

Dr. Prociuk did not just testify to 'medically contraindicated' but also testified to a reasonable degree of certainty that the AMI meter was injurious to Alexia' health and causal for her palpitations (Tr. 4/11 at 258:21-25.), unsafe (Tr. 4/11 at 259:10), and that another AMI meter will cause an exacerbation of Alexia's symptoms and specifically cause another cardiac arrhythmia.

PECO's argues that Dr. Prociuk's opinions are contradictory because it stated the "science in its clinical infancy." PECO argues "science in its clinical infancy" cannot be used to establish cause.

There are several problems with PECO's argument.

First, Dr. Prociuk testified that the role of a clinician is different than being a scientist because they act is an interface between the scientist and the patient's subjective experience (Tr. 4/11 at 290:22-23). In this role, standards of care allow them to act on clinical science that is still in infancy, or not yet entirely established. (Tr. 4/11 at 290:1-3). He further identified that this distinction is made because clinicians work on individual cases (Tr. 4/11 at 297:17).

As argued in our Main Brief at page 16, burden of proof to admit facts in this case is not the same as burden of proof to also show that in making an opinion the medical expert has established his opinion by secondarily reviewing the individual case with the entire medical community and establishing that at least 50% of the medical community has reached the same opinion. Even Dr. Israel testified that treatment decision are based on evaluation of the patient in the context of what is known at the time. (Tr. 4/13 at 246:13-15; Tr. 4/13c at 246:2-4)

Clinicians do not prove causality in a general scientific sense as for example Dr. Davis would be required to do. Instead clinicians are showing that something occurred, or that they believe that it is likely to occur based on their scientific knowledge of what can and can't occur <u>in a specific patient</u>.

As an analogy, establishing that a single car has crashed because of a broken part is not the same as establishing that no car in general can possibly crash or establishing that any car at random is probable to crash because parts have high failure rates.

Showing evidence that a single car did crash and the cause was a broken part might only require showing the mangled car, the broken part, some evidence that the part was broken before the crash and that the broken part was related to causing an important system like the steering or brakes to fail (e.g. a hole in the brake hose on the crashed car, brake fluid on the ground leading up to the accident site). Scientific literature or studies might not be involved at all. The cause might well be established as the preponderance of evidence because there was no countering evidence to suggest alternative causes and a single plausible cause was identified.

Showing that it is not possible for any car in general to have ever crashed because it not possible a part to have possibly failed is entirely different. By analogy, PECO is asserting that it is not possible for this part to have failed. They argue this because they have read some literature showing that it is a good design and assert that they have heard no reports that ever show broken parts before. They then ask Dr. Prociuk to provide the scientific literature showing that the broken parts are common and are causing high rates crashes in general. That's not his burden.

Second, as much as PECO would like to put words in Dr. Prociuk's mouth and claim 'science is in infancy' as pointed out in Regarding PPFF 65, 66 above, this is a false construction. The science is continually debated, and every patient has unique circumstances, so clinicians are still always obligated to act in situations where there is still uncertainty. The clinicians job is to interpret and apply the scientific evidence to individuals. PECO is attempting to argue that it is the clinicians job to only provide the scientific evidence, and instead it is the courts job to interpret and apply the scientific evidence to individuals. This belittles the role of an expert.

With respect to EHS, the scientific questions are not so much related to EHS being 'In infancy.' Even Dr. Israel and Davis state 'the symptoms are real' and use the label IEI-EMF. The issues have been known for 50 years. The question is not 'maturity,' but rather over a specific debate - it is possible that there is a subgroup of patients with IEI-EMF are truly sensitive to EMF, or has it been established that this syndrome is exclusively and entirely explained by a nocebo effect and EMF cannot possibly cause.

There is quite a bit of evidence. And, 2 major scientific camps on this issue – which for purposes here we can say are the Dr. Rea camp, and the Dr. Rubin camp. Both sides are strongly opined. Both camps are looking at the <u>same literature</u> and studies. The difference is not in the literature, but instead how much weight a particular study gets, or how it might be interpreted to show or not show an effect. Both sides agree that the literature can be difficult to interpret. The 'Dr. Rea' camp argues that they have clearly seen patients that are not explained by nocebo, and an enormous amount of epidemiology that suggests that truly sensitive patients exist. The 'Dr. Rubin' camp argues they are not yet convinced, and primarily cite Dr. Rubin's systematic review as their evidence. There are no valid statistics or polls to show any group has a larger following, but as a generalization, eastern and central European countries such Italy, Switzerland, Poland, Austria, etc., along with and Russia, China would tend to side with Dr. Rea's camp, and typically favors government funded studies. The US, Japan, and Canada have tended to side with Dr. Rubin's camp, and is much better funded through industry. Finally, it should also be noted that the vast majority of physicians and scientists have no opinion on this subject whatsoever. They simply have never considered the issue in the same way that a dermatologist might not ever look into an obscure disease normally followed by a neurologist.

Metaphorically, in his testimony Dr. Prociuk establishes himself in Dr. Rea's camp, recently coming from the group that had never seriously looked into the issue. He thinks it is very probable that truly sensitive

patients do exist and there is some evidence to support this. His choice would still be somewhere between 'uncertain' and 'some early evidence here.' But since, the burden is 'preponderance of evidence, or evidence more convincing, by even the smallest degree' 'some early evidence' would still meets this burden.

He uses the same framework for smart meter cause specifically. In his expert opinion, there is no evidence at all showing that a smart meter cannot cause health issues, there is evidence that EHS exists, and that smart meter's cause EMF, and at Prociuk Exhibit 3 providing 'early evidence' that smart meters have been known to be associated with the same symptoms Alexia described. From this his medical expert judgement of the burden 'even by the smallest degree' has been well exceeded. But further with understanding the fullness of Alexia's history inclusive of potential dangerous cardiac arrhythmias in the absence of any other known cause he states a passionate plea with the strongest language he knows - "MEDICAL CONTRAINDICATION!!" Dr. Prociuk was visibly emotional when he testified

> *"I was trained to write as a physician in medical terms and strict medical contraindication is an unequivocal term that any doctor would say absolutely cannot be done because it will harm this person. And there would be no question about the meaning of that catch phrase" (Tr. 4/11 at 80:17-22).*

Third, clinical diagnosis is based on a probabilistic as described in the section above under Dr. L. McKnight. In all circumstances this diagnostic framework is founded on a theory of 'probability of cause' in relation to all other alternative explanations. In Alexia's case, Dr. Prociuk can reach 'beyond reasonable medical certainty' because there are no significant balancing alternative explanations and more clear evidence that EHS exists through studies like Dr. Rea's study, and some evidence that smart meters specifically have been noted to have these effects in case series. There is a 'preponderance of the evidence' (evidence more convincing, even by the smallest degree) because there is essentially zero evidence to indicate anything else. Even the weakest and most 'clinically infant' of evidence applies to move the needle in a preponderance direction when the other side of the balance is zero.

There is no conflict in Dr. Prociuk's opinions at all. His expert medical opinion is absolutely clear and unambiguous. He testified that Alexia was adversely affected by the smart meter (Tr. 4/11 at 258:21-25.) and that PECO's use of a smart meter will constitute unsafe situation for her (Tr. 4/11 at 259:10) that he holds that opinion beyond a reasonable degree of medical certainty (Tr. 4/11 at 256:17-23), and explained why he believes this.

3.3.4 Mr. Bathgate's Testimony

PECO argues that Mr. Bathgate's' testimony isn't about health or safety. That's true, but neither is Mr. Pritchard's. Their purpose in this case is to better understand how an AMI meter works, and how it can fail to operate as expected. This is relevant because it informs how any accommodation would or would not solve the medical safety issue, and explains how Dr. Davis' dosing assessments are incomplete because they fail to account for important mechanisms by which an AMI meter could emit EMF and transmit this in different ways.

PECO argues that Mr. Bathgate was unable to explain why the FCC class B compliance issue has not yet come to the attention of the FCC, and that it requires conspiracy theory to assert that this could have gone unnoticed. Of note, however PECO misses the major point which is that Mr. Bathgate

demonstrated that the AMI meters create huge amounts of 'dirty electricity' or extremely high transients relative to other devices in a household like the McKnight's.

We noted in our Main Brief, that we agree that FCC compliance issues are the jurisdiction of the FCC, and will be reported separately to the FCC. The reason for introducing the issue here is simply to point out how extremely 'dirty' these devices are, and thus that they are an important consideration for a person which is unusually sensitive to EMF.

PECO argues that 10s of millions of AMI meters have been deployed, so if they were not FCC class B compliant, then this would have come to the FCC's attention by now. Notice that they do not rebut his findings with actual values or any actual facts here. Instead they rely on the weak assertion that it seems improbable.

This is not improbable at all. As explained in PPFF 94, this is not something that the FCC would check unless they had a report. And, there are very few people that would know to check, much less how. Indeed, PECO itself did not know to check or how to check. Why would PECO expect someone else to? This kind of thing comes up when problems occur, such as court cases where there are reports of smart meters causing issues more generally, then and only then somebody might check. Ignorance of an issue here is not a rebuttal.

And again, the FCC has jurisdiction here, and our concern isn't so much the legality, but instead just the fact that the device has the effects, and those effects are of concern in the accommodation.

PECO claims that they have a license and that gives them an exemption for issues of conducted emissions. As discussed above in Regarding PPFF 101 and 174, PECO's license is for intended RF. It does not provide the unrestricted ability to generate unintended RF, or conducted emissions. And even if it did, it doesn't address the concern that the physicians stated these effects are important to consider in a patient with unusual biology and sensitivity to EMF. PECO acts as if the physician concern is to 901Mhz specifically. It's the wide range of electric, magnetic and RF fields. The concern is to EMF more generally, although there may be certain characteristics such as bursting or modulation that appear to be more biologically active.

PECO claims that AMI meter reduce transients. This is discussed on page 58 of our Main Brief. This is absolutely not possible because there is no filtering circuitry in the AMI meter (Tr. 4/11 at 362:8-17), and in order to filter it requires a path to ground that the meter does not have (Tr. 4/11 at 364:12-15). There is no grounding prong on the meter. The fact that Dr. Davis would report this is suggestive that he does not know what transients are or how to measure them. Arguing that his measurements show that a smart meter with a switch mode power supply could ever reduce voltage transients is like arguing that adding a one more stone to a scale will somehow reduce the weight. It is clear that whatever Dr. Davis measured, it was not voltage transients. In fact, Dr. Davis never states any values, or shows any graphs, never even described his test equipment or methods, so it is impossible to say exactly what he measured, or relate them to other devices in the McKnight household.

Further, it should be noted that Dr. Davis was not noted as an expert in this area. Dr. Davis is a physicist, but not an expert in the design and measurement of power measurement systems as Mr. Bathgate is. Dr. Davis works for a university and knows theory and publishes academic papers. Mr. Bathgate knows how parts go together to make the devices operate. He has built these devices in a commercial setting,

and been involved in field investigations where the theories and assumptions of small effects turned out to be false when measured in the field and this affected the launching of the space shuttle (Tr. 4/11 at 325:5-326:12). There has been no testimony to suggest that Dr. Davis is experienced or even has ever done these kinds of in-the-field investigations.

So, Dr. Davis' verbal statement with no report or verifiable data holds no weight at all compared to the written report of Mr. Bathgate who provided his methods, showed his setup, listed all his values, included appropriate baselining, and the included pictures of the actual waveforms themselves. None of his methods on this section were challenged as being incorrect. PECO only weakly asserts that they did an unspecified test with no details provided and didn't see the same results.

PECO makes a lot of assertions that the HF35C meter is an unreliable device and Mr. Bathgate did not know how to use the HF35C meter correctly because he measured at 1-meter distance vs 2-meters distance. This is rebutted more in our Main Brief at page 59 (section 6.2.4.3.2) above in Regarding PPFF 99, and Regarding PPFF 182. In short, this an attempt to reference a manual out of context. The purpose of the test was not to accurately measure power density because the value is so high it simply over ranges the HF35C. Source identification and burst timing are unrelated to this. The fact that Dr. Davis would mention NIST calibration is ridiculous, and shows how he has no experience in field testing or the issues that arise there. NIST calibration would ensure the power density measured was within a range of a true value, and might be relevant if there was question if the value was off within a few microwatts/m2 or less. The numbers here are thousands of times higher. So, this is like claiming you need NIST certification to know that your consumer grade tape measure was off by a quarter inch when the measurement was 30 feet.

PECO argues that Dr. Davis's measurements are better because Dr. Davis says that he used 'expensive' equipment. Really? What does this mean and why does it matter? Again, there are no details provided. Dr. Davis provided no rebuttal about how the 'expensive' equipment is relevant to the purpose. 'Expensive' is totally irrelevant, and they don't even describe what kind of instrument was used to see that the device has the correct intended purpose. The fact that he even uses 'expensive' as an argument makes one wonder why he could not articulate more detail about what the 'expense' was for, and perhaps only thought 'more expensive' means 'better'. It makes him sound like a clueless snob. He could have driven to the proceedings in a Rolls Royce or an old pickup truck. The Rolls is more expensive. But, that doesn't mean it made a difference in getting to the destination.

But, also, a single check in a lab would never be sufficient. PECO has not done real world field testing (Tr. 4/12 at 246:6-10). Mr. Pritchard testified that the system is 'highly automated' and programmed remotely. Thus, there are no guarantees at all that the single device Dr. Davis measured is reflective of real world use (Tr. 4/11 at 142:15-17, also see discussion in Main Brief at section 6.2.4.2.7 beginning on page 56).

Also, Mr. Pritchard testified that use of spectrum analyzer would be sufficient to indicate the meter as the source (4/12 at 243:1-3), and Mr. Bathgate testified that he did this (Tr. 4/11 at 450:20-23).

PECO argues that Mr. Pritchard attempted to replicate Mr. Bathgate's observation of a secondary antenna but found no correlation. Again, there are few details of exactly what Mr. Pritchard did such as what meter box was used, what AMI meter was installed, and what other background devices might be interfering with his evaluation. 'No correlation' does not imply that Mr. Pritchard didn't see effects

around the buried cable, but instead could mean that sometimes there were effects seen, but instead they could not be attributed to the location of buried cable. Thus, it's probable that the lack of correlation in Mr. Pritchard's evaluation was simply that there was some other device like a wifi router or cell phone generating the signal seen, and Mr. Pritchard did not take precautions to look to ensure these other known sources were removed from the area or turned off. And since the HF35C does not indicate what frequency, but only the power density, and Mr. Pritchard didn't check also with a spectrum analyzer, it's likely that he just didn't have an appropriate baseline for his test. The reason why Mr. Pritchard has difficulty in understanding the 'directionality' of the HF35C meter is likely because he does not understand how to appropriately establish a baseline. Again, PECO doesn't regularly do field studies, and Mr. Pritchard stated only having hobby interest. Mr. Bathgate does this professionally for a living.

The critical distinction between Mr. Bathgate's testimony and Mr. Pritchard's is that Mr. Bathgate also verified that the effect went away when as the AMI meter was removed and replaced by another meter without a radio (Tr. 4/11 at 390:24-391:3). Mr. Pritchard didn't do that.

Next, PECO argues at the bottom of page 49 of their Main Brief that "Mr. Bathgate's inability to detect background UHF transmissions at the McKnight residence using the HF35C meter, Dr. Davis explained that, even though the UHF signals are hundreds of times larger than the AMI transmissions, they are still extraordinarily small."

Mr. Bathgate never stated he used HF35C to detect UHF. Instead he testified specifically he used a spectrum analyzer (Tr. 4/11 at 385:7) which happens to use a non-directional antenna much like any TV that would receive the UHF, and the reason why our TV also doesn't pick these up. In both cases the UHF signal strength is so weak that it is buried in background noise (e.g. see https://en.wikipedia.org/wiki/Signal-to-noise_ratio)

The reason why any device like this would see the AMI meter, but not the UHF signal is because the AMI meter bursts it signals, while the UHF is a continuous signal. Dr. Davis's computations do not properly account for burst effects, and therefore are misrepresenting the AMI meter output by a factor of approximately 150 *thousand*-fold. The fact that tower gateways work and receive the signals above background noise levels at more than 2 miles away proves how ridiculous Dr. Davis' computations and comparisons are.

PECO argues on page 50 of their Main Brief that when Mr. Bathgate re-measured timing characteristics using that because he 'saw the same type of' periodicity, that this somehow proves that it was some source other than the PECO AMI meter. This argument makes no sense whatsoever. Measuring the timing doesn't change with this change in distance, and Bathgate testified it was the power density was only quantified to be enough to over range the meters. (Note: even if PECO were so confused to think that periodicity is power density, finding the 'same type of' would not indicate that there is some other source. Even if it was some other source and the measurement depend on distance, changing the location of the HF35C would also change the distance to the other source too, so it would still result in a change, not 'same type of.' PECO's logic is just bizarre.)

Mr. Bathgate's finding 'same type of' in this context is clear. 'Didn't change' means it didn't make a significant difference. It means the AMI meters were still transmitting too frequently, and when they did transmit it just resulted in an over range on the HF35C.

In sum, the major points of Mr. Bathgate's testimony remain unrefuted.

1) AMI meters that use switch mode power supplies often create very high unintentional conducted emissions onto household wiring, because of a faulty design of their switch mode power supply.
2) Some AMI meters transmit far more frequently than anticipated by computations of a theoretic design.
3) Secondary antenna affects can occur because of the close proximity of the AMI meters primary antenna to other wires in the meter box and create conducted emissions on those wires.
4) PECO has no idea how their meters operate in the real world because they never perform in field verifications, and don't seem to know how do the in-the-field measurements. PECO has no way to verify that their meters are operating correctly in the field on not. Thus, a medical experiment to try different AMI meters and see if Alexia's different biology responds does not have appropriate controls in place.

3.3.5 Dr. Rea's Testimony

PECO argues that Dr. Davis reviewed Dr. Rea's study and found it "not scientifically reliable." As discussed in our Main Brief at page 37, Dr. Davis isn't quailed to read or comment on this. And Dr. Davis' review made it clear he likely didn't even read the article because he criticized it for not having information that was clearly present.

PECO argues that Dr. Rea's provocation study didn't include a test of 901 Mhz. This is true, but they misunderstand what the provocation study is for. It establishes an underlying disease pathology. That disease pathology is associated with other sensitivity. This is common in diagnostic provocation testing. For example, a Methacholine challenge is useful in testing for asthma, but that does not mean the asthma is specifically triggered only by Methacholine. (Also, in case it creates question or confusion a provocation study may be used as a diagnostic test, however diagnostic tests are not done as randomized control trials to establish causality. In a study evaluating a diagnostic test the goal is to determine the test characteristics such as sensitivity and specificity or likelihood ratios of the test compared to a gold standard where the disease is officially called. There is no randomization, blinding or control arms. In this case that would be the protocol of the 1991 study. In use, a diagnostic test fits into the framework described above in Dr. McKnight's testimony where the clinicians pretest probability of disease to a posttest probability.)

Dr. Rea's study on Alexia established diagnostic certainty that she has EHS. In other words, her biology is markedly different than a normal person, and because of that she perceives effects of EMF differently. Her symptoms are triggered by the EMF directly, and there is no evidence that they are triggered from nocebo effect.

Dr. Rea's signature on a letter in PECO Rea Cross Exhibit 4 urging the WHO to re-examine the issue of EHS and update their conclusions and recommendations in no way is a statement that 'the international medical community' accepts EHS or not.

The reason why Dr. Rea would need to urge the WHO to change its position is that the WHO is an organization. It's not the 'international medical community', although its positions *should* have gross intent to reflect it. Among other things the WHO only stated the equivalent of 'not sure at this time' and that was several years ago. The letter urges a re-evaluation and reconsideration of evidence

because he believes there is evidence establishes causality. Thus 'not sure at time 1' can/should change to 'sure at time 2.' These shifts of arbitrary lines in the sand happens all the time in medicine as explained above with Sepsis, Diabetes, and Hypertension above. The scientific statement that Dr. Rea signed asks to consider this a "true medical condition" as opposed to "a condition not taken seriously enough" in the same way one might say a "car has a true value" as opposed to "car has an artificially low value." In this case the semantics are not as oppose to a "false."

Moreover, as stated above, the truth of a scientific position is never established as a kind of popularity contest. If it were, then perhaps PECO would accept my argument that science can establish that electrical transmission charges should be free as long as I can show that this idea would be popular with the vast majority of consumers.

PECO brings up that Dr. Israel disagreed with Dr. Rea's medical diagnosis and treatments. This is discussed more extensively in our Main Brief at page 35. Dr. Israel gets this completely wrong because he totally ignores any event timing and therefore misinterprets Dr. Rea's inclusion of a historical medical issue with assigned diagnostic label for being a current medical issue with assigned diagnostic label. It demonstrates that Dr. Israel glosses over details as he reads or listens to patient histories.

Dr. Rea's diagnosis list is composed of very generic and high-level terms without specific mention of what specifically caused was because these were historical items for him. For example, the label 'toxic brain encephalopathy' only means that some toxin cause Alexia's brain to not work correctly because she had a history of 'brain fog.' Dr. Rea probably believed that was from the EMF as a toxin, but it clearly was some toxin. There is no indication at all to refer this to a specialist because the history makes it clear that this problem was already solved.

Similarly, Dr. Rea didn't say 'significant immune dysfunction' he just said, 'immune dysfunction.' Dysfunction means there is some generic abnormal functioning. This was because there was nonspecifically a problem with her immunity (notably that she seems to hyper react to certain heavy metals). There is no need or indication to refer to a specialist here because Dr. Rea ***IS*** a specialist here. He recommended a kind or immune modulation for this.

If anything, Dr. Israel's jumping to conclusions on this is what is worrisome, and gives reason to not have confidence in Dr. Israel.

PECO makes much ado about the Texas Medical Board (TMB) mediated order of 2010. Once again, the allowed late filing (http://www.puc.state.pa.us//pcdocs/1566866.pdf) explains this in much more detail. But, the short story is that after 40 years of unblemished practice, writing several textbooks, and authoring hundreds of peer reviewed articles, and serving as President of for the American Academy of Environmental Medicine, Dr. Rea was targeted and falsely accused. Then, after years of litigation the board was unable to make their charges stick, but instead were backed into a mediated order where the only action on Dr. Rea was to provide a piece of paper indicating that the board disagreed with one specific treatment. A treatment unrelated to EHS.

PECO states that the letters in Appendix A are an attempt to re-litigate. The reason to introduce these letters is that PECO entered PECO Cross Rea Exhibit 2 as attempt to show documents that did not at all account for the litigation that occurred afterward. PECO's attempt to introduce this is an attempt to re-litigate, and therefore requires our explanation of what that litigation found and why. The letters in

Appendix A show how PECO Cross Rea Exhibit 2 was a fabrication and setup that didn't work. The charges were Dr. Rea was essentially performing malpractice on 5 patients. But when the case was litigated, it became apparent that the patients not only said this wasn't so, they wrote letters to strongly support Dr. Rea and indicated they had no idea that their names had even been used.

Appendix B, C and D show why Dr. Rea can have confidence to explain to patients where and why a medical board could disagree with him. He just explains why he does things, that he runs a very specialized practice, and has good experience for doing specialized things here, but he understands that there are some doctors that would disagree because the topic is quite specialized. He doesn't push this – patients can choose. But his patients still trust him because he gets results. Thus, it doesn't affect his practice (Tr. 4/12 at 102:12-19). His confidence comes through in testimony as demonstrated by how easily and naturally he answers questions about this. He knows he has nothing to hide here.

Appendix E, F and G. outlines how the litigation of this was extensive and the abuses of the board went well beyond the single 'bad egg', but involved several people of the board working in conjunction, and how Dr. Rea was not alone in being targeted. That complex litigation created a situation where the TMB was forced to go to mediation. The TMB had full power to take away Dr. Rea's license, and they initially tried. PECO doesn't explain why Dr. Rea's license was not taken away by the board when they had full control and authority to do that. PECO does not explain why every single one of the other charges listed in PECO Cross Rea Exhibit 2 were dropped. They were dropped because Dr. Rea was falsely accused and the TMB was forced to admit that.

Appendix H shows the final action in 2011 that changed the board – after the mediated order. PECO states there was no connection between the 2011 legislation and the other events of the case, but then what is their explanation for this piece of legislation even existing? Why would a bill like this unanimously pass and why does it explicitly state restrictions to better control the medical board for all the abuses mentioned in the litigation like a requirement to name the accuser? Does PECO believe this was just random chance?

PECO argues that because of the mediated order, Dr. Rea's testimony should be given no weight. If PECO's concern is that the TMB is to be trusted and had an issue with Dr. Rea, why do they not trust the TMB as they also make a judgment that the entire remainder of Dr. Rea's practice IS endorsed because they specifically allowed him to continue practice and did not restrict his capacity to treat patients in any other way. Clearly the TMB gives him weight. At best they disagreed with him on the use and preparation of unusual antigens. Even for antigens the board didn't restrict Dr. Rea from administering these. They only required that he notify patients with a specific informed consent.

Importantly, in their Main Brief, PECO never addresses the fact that Dr. Rea was recognized as the only witness in this case who has expertise in EHS. And, they raised absolutely no voir dire objections to his expertise in this area (Tr. 4/12 at 58:11-19).

And, the mediated order doesn't have anything to do with the topic of EHS. The TMB never stated a concern that his practice or treatment of EHS was not endorsed. And they specifically allowed him to continue practice and hold a Texas License. The mediated order did not invalidate his 40 prior years of peer reviewed publications and expertise in the field. So, there is no reason to question his experience or judgement with respect to this subject. He is the only person in this case who has seen thousands of

patients with this syndrome. His experience allows him to know what is common, how patients present, what to look for as he reads the literature, and what works and doesn't work.

And he testified, that beyond reasonable medical certainty that the smart meter is was what caused the change in Alexia's health, and specifically was the cause for her arrhythmia (Tr. 4/12 at 74:5-18), that another smart meter would be unsafe for Alexia (Tr. 4/12 at 75:12-16) and that he recommended an analog meter because they have been tolerated by those with EHS, and other kinds of meters had not been tested (Tr. 4/12 at 76:6-17).

3.3.6 Mr. Pritchard's Testimony

PECO asserts on the top of page 56 of their Main Brief that AMR meters transmitted 288 times/day, along with several other cited values. We have no reason to dispute Mr. Pritchard's statement, however it should be noted that this is a theoretic value, not a verified measurement. Mr. Pritchard testified that he has never tested this to see if the meters perform as expected in the field (Tr. 4/12 at 246:6-10). And, Mr. Bathgate points out that this is just speculation (Tr. 4/11 at 371:20-21), and in his experience of doing hundreds of field tests, it is very rare that the system works as anticipated when it is actually measured in the real world (Tr. 4/11 at 376:9-12)

PECO argues that it does not operate a "collision network," but instead uses methods to allow communication "without collisions." This isn't quite true. Mr. Pritchard testified to a system of a different design that likely reduces some collisions, and does not result in an immediate resend. However, a the 'highly automated', 'remotely controlled' system has a very similar effect. Collisions and missed transmission can still occur, and if these collisions occur then the effect will be to adjust a parameter on the meter to send data frequently and 'optimize.' Without field measurement this system could easily behave as observed by Mr. Bathgate (Tr. 4/11 at 380:23-25).

PECO states that it obtained written equipment authorization certifications from the FCC allowing use of the meters, and that that the meters complied with FCC regulations. PECO provided its equipment grants in PECO Exhibit GP-12.

However, the equipment authorization does not mention anything about passing Class B specifications. But, when questioned by his own council, Mr. Pritchard stated that the FCC would not rely on the manufacturer to do this, and that he wasn't involved and would not know if such a test was performed.

And, Mr. Pritchard testified several times that the FLEXNET radio transmits at 2 watts (Tr. 4/12 at 154:25; 211:12-16; PECO Exhibit GP-5), and that this number comes from the manufacturer (Tr. 4/12 at 157:4-5). Further, Mr. Pritchard stated that the license allows up to 2 watts (Tr. 4/12 at 157:7-8, 252:1). But, the actual document in GP-12 shows the grant is only up to between 1 and 1.3213 watts depending on the meter. So, if Mr. Pritchard's testimony is correct, it suggests PECO is in violation of the FCC equipment grant in GP-12 because Mr. Pritchard did not know that the license is NOT for 2 watts.

Once again, this is in the jurisdiction of the FCC, and will be reported separately to them to investigate. Our only complaint in this proceeding is related to health. But, it shows that Mr. Pritchard's testimony is at least questionable if he didn't even check his own exhibit before he testified.

PECO argues that the block diagram comparison of the AMR and AMI demonstrate the only functional difference is the periodicity of the radio transmissions and the remote disconnect. PECO conveniently omits Mr. Pritchard's clear testimony that the AMI meter has a radio that is significantly more powerful,

and thus transmits 4-5 times as far and 'sometimes farther' (Tr. 4/12 at 150:12; 154:25; 213:15-25; PECO Exhibit GP-3, GP-5), and that 40% of the AMR meter were of a totally different analog design (Tr. 4/12 at 149:24).

We agree with PECO that transients are generated by device loads, and that devices such as a hair dryer and LED lighting would produce transients. However, the issue is not that transients exist, but instead how large they are. The McKnight's have taken several steps to reduce these large transients at their house (Tr. 4/10 at 19:23; 85:13-17) to accommodate Alexia's unusual sensitivity. The results of these changes were verified by Mr. Bathgate who testified that indeed the transients are quite low (Tr. 4/12 at 20:20-21:5). And, Mr. Bathgate showed that the transients generated by an AMI meter were many times higher than the other devices at the McKnight household (Tr. 4/11 at 348:14-16; 354:20; Complainant Joint Exhibit 5 at page 3-4). By analogy, PECO's argument here is like stating that because some measurable amount of salt is always present in your drinking water, it would be ok if we just used sea water instead of getting it from a well. The quantified values matter.

Beginning with the last paragraph on page 57 of their Main Brief, PECO describes that conducted readings using a 'high quality power quality meter' and that it showed that even with no meter of any sort, the McKnight Residence is "very noisy, representing different transients . . . that are occurring in the household."

This is a reference to PECO Exhibit GP-13, and is addressed in their Main Brief at 6.2.4.2.1, and in late filing, http://www.puc.state.pa.us//pcdocs/1567065.pdf. This exhibit and testimony not only does not show that the transients at the Mcknight Household are high, but embarrassingly showed how PECO engineers did not even know how to use the Rush Track 7000, or recognize that the graph they provided was showing current not voltage and cannot be interpreted without other data.

PECO argues that we did not limit this discussion to 'issues that were parts of the record'. As *pro-se* complainants we are not quite sure what PECO means by this, but presumably they are attempting to imply some legal technicality we did not follow, perhaps to try to strike the late filing as invalid and hide the late filing contents. If there is some way we incorrectly entered evidence, we don't know what it is, but it would support the point in the introduction of our Main Brief which is PECO is "…very experienced in tactics to get any piece of relevant evidence from our side from being presented at all. They know how to intimidate into submission, and have shown that they will use this to the fullest extent."

Notice that in their argument PECO never even attempts to rebut the obvious fact that the title of Exhibit GP-13 the graph states "Current" not "Voltage." They do not argue the truth of the matter that not only could Mr. Bathgate not make heads or tails of it, neither could the person who sells the device. Nor did they ever argue that the issue wasn't voltage. When Mr. Bathgate described transients, he clarified voltage (Tr. 4/12 at 29:19-22). When Mr. Pritchard defines the Rush Track 7000 he describes that it can record "the voltage form" (Tr. 4/12 at 183:22).

Nor does PECO attempt to explain that there are no comparison values or baseline to determine what a normal acceptable level would look like or at what point any values would be abnormal. Nor do they state how they would appear different if an AMI meter was installed. Nor do they explain how this graph this relates to the voltage transient measurements taken by Mr. Bathgate, and rebut his claim. Even Mr. Pritchard testified that he had "no basis to give an interpretation" (Tr. 4/12 at 240:17-18).

The unambiguous point of the late filing is PECO Exhibit GP-13 is absolutely meaningless and cannot be given any weight because it doesn't even make any statement about voltage transients. The fact that a power company would introduce such an exhibit demonstrates that they either don't know what they are doing, or they do know but are trying to establish a false testimony.

Next, PECO points out that Mr. Pritchard testified to moving the meter box being an accommodation. They fail to point out that when questioned on any details of this on cross examination PECO objected and stated, "Just because Glenn said that it's – he can't - isn't authorized" (Tr. 4/12 at 244:24-15).

The problems with a relocation are addressed in our Main Brief at page 61. The major problem with a relocation is that it does not solve issues related to secondary antenna effects or other conducted emissions onto the household wiring. It therefore does not address the safety concern. Even under circumstance that there is question about secondary antenna effects being an issue at our meter box, the ambiguity in the phrase 'we will work with you' may end up requiring us to pay several thousand dollars and dig up our driveway for a solution that might not work. This isn't reasonable.

Such an accommodation is not consistent with prior PUC rulings that establish our right to fully utilize our property (Docket C-2016-2547322, Mattu v. West Penn Power at page 7).

Finally, PECO's asserts that AMI system has far less radio transmission than 'any other utility system.'

According to the US Energy Information Administration, as of 2016 (last data available), still about 22% of all meters were standard, non-AMR/AMI type (https://www.eia.gov/electricity/annual/html/epa_10_10.html). As a minor quibble, technically PECO's assertion is false because these old systems have less radio transmission because they don't have a radio.

But also, as noted several times, this is a theoretic assumption, not a measured value. And, Mr. Pritchard actually denied the system has capacity to 'tune down' as an accommodation. Instead he testified that this is an 'highly automated system' that tunes to an 'optimal number' which should be 3-4 hours (but was never verified in the field). He explicitly did NOT state that a person wanting accommodation could choose any lower communication rate (Tr. 4/12 at 202:10-18), and even testified that this was NOT an accommodation, or choice made to decrease RF exposure to customers (Tr. 4/12 at 200:11-14).

Less radio transmission means little when there is no possibility for no transmission. Almost all other states have some form of an opt-out. Usually the debate has not been over "IF customers can" but instead "how much should they be required to pay to do so". PECO is attempting to argue that less RF transmissions is somehow better than no RF transmissions. This is a weak argument.

More importantly, 'less transmission' is not the same as 'less powerful transmission.' As mentioned in our Main Brief in section 6.2.2.5.7, this ignores how the human body works. 'Less transmission' is only occurring because the transmission is occurring in short bursts. But, the human body simply does not have any 30-minute averaging protein. It feels the bursts, and the burst leads to biochemical cascades. By analogy, there are fewer transmissions of tsunami waves across the ocean than regular 2-foot swells, too. This does not mean that the tsunamis are less destructive than the regular 2-foot swells.

3.3.7 Dr. Davis' Testimony

Dr. Davis' testimony can be questioned on technical legal grounds because of Mr. Watsons *pro hac vice* issue as noted above.

However even if allowed, Dr. Davis' testimony does not rebut the health claims. Dr. Davis has no medical or biologic expertise to make appropriate comment.

PECO argues on page 59 of their Main Brief that the radio transmissions from AMI meters are many times lower than the FCC MPE standards. We have extensive discussion of this topic in Main Brief beginning on page 36, and inclusive of the fact that the FCC MPE standard do not establish or guarantee safety in all humans (section 6.2.2.5.5), and were derived from ANSI documents that noted biologic effects and doses hundreds or thousands of times lower and explicitly mention that they do not consider all factors that could affect safe limits of exposure (https://ieeexplore.ieee.org/document/27810/ at 14), and that have warnings about pulsed fields that behave differently (https://ieeexplore.ieee.org/document/159488/ at 33). We also point out how Dr. Davis is ignorant of relevant concepts in biology and that his dosing computations cannot properly accounted for the effects in diseased states of biology (section 6.2.2.5.6). We point out how he inappropriately does not account for burst effects (section 6.2.2.5.7). We point out how his computation are of theoretic assumptions of the system that were shown by Mr. Bathgate to be incorrect when measured in the field. We point out how Dr. Davis makes no computations or considerations how his numbers might be altered by EMF being emitted through conducted emissions (section 6.2.2.5.8). And finally, we note that Dr. Davis never actually states his formulas or methods so they are impossible to validate but his computations in relation to cell phone years use seem impossible to reconcile across his different testimonies (section 6.2.2.5.9).

The FCC MPE never asserted it was a guarantee that no biologic effects were not possible at lower doses. Most other countries set their limits lower, and some several hundred times lower (Tr. 4/13 at 124:24-125:7; Tr. 4/13c at 123:18-25).

And, as noted above in Regarding PPFF 165 the FCC has an open item since 2013 to re-evaluate its limits. The uncertainty in this area lead North Carolina Utility Commission to conclude that not only should there be opt outs (which were always possible), but further that for those with medical exceptions, the opt out must be free. (http://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=5a9371bf-4f6e-4943-8b91-6e28ace9ed24 at 13 last 3 lines, and first para on page 14).

Based on Dr. Davis' ridiculous computations, PECO argues that UHF signal at our house is 168 time larger than exposure to an AMI meter. Once again, the comparison is not relevant because the UHF TV transmissions are continuous, while the AMI meter is transmitting via bursts. Accounting for the burst, the AMI meter is not 168 time less, but instead hundreds or thousands of times higher. The gateway towers can detect the AMI meter transmission from background because of this. And, so can Alexia's body (See the discussion above in Regarding PPFF 171 thru 172, and discussion of signal to noise ratios under Mr. Bathgate's Testimony).

Similarly, AMI meters don't 'reduce exposure' relative to AMR's. They use a stronger radio, that transmits 4-5 times farther. Once again, the effects of a short bursts of RF in biology simply are not averaged over 30 minutes or 3 hours.

On page 60 of PECO's Main Brief, they indicate Harmonics and transients are normal in the delivery of electric service. Again, the relevant point is that PECO never discusses the *magnitude* of voltage harmonics and transients. To state that any real circuit will have some harmonics and transients, and that they *exist* whether an AMI meter is in use or not is true, but irrelevant. It is NOT true to say that harmonics and transients at any *magnitude* are 'normal.' And, it is not true the magnitude of the voltage harmonics and transients is the same whether an AMI meter is in use or not. Mr. Bathgate showed that the magnitude of the transients of an AMI meter (with a Switch mode power supply) are significantly higher than other devices at the McKnight household.

PECO argues that Dr. Davis examined the AMI meter components and finds nothing capable of causing any biologic effects in people. But, Dr. Davis was never admitted as an expert in knowing what components would be of relevance in an AMI meter circuit board design that might be creating EMF. Mr. Bathgate had designed and built these devices in a commercial setting. Dr. Davis did not claim anything like this. We would be surprised if he could even identify which part is the antenna. And as mentioned in our brief, it is clear that he does not have expertise in biology or medicine to make a claim that it did or did not cause "any biologic effect."

Accepting this argument would be somewhat akin to accepting a child's testimony that they took apart a vacuum cleaner and found nothing capable of causing it to suction up dirt.

3.3.8 Dr. Israel's Testimony

Dr. Israel's testimony can be questioned on technical legal grounds because of Mr. Watsons *pro hac vice* issue.

Problems with Dr. Israel's review are discussed more extensively in our Main Brief at section 6.2.2.4.3 on page 31, and in this reply brief under the section of Dr. McKnight's Testimony. Dr. Israel's evaluation was trivial and did not follow best practices for a literature review such as a systematic evaluation to evaluate for study bias. When cross examined he was unable to cite any relevant details of the studies, and missed several obvious problems such as the high dropout rates.

Moreover, he testified he has never even seen a single patient with this syndrome, and has not *even thought* about what he might say to a patient with this syndrome (Tr. 4/13 at 230:14-21; Tr. 4/13c at 230:3-10).

PECO argues that Dr. Israel testified that he did not see medical records to show that Alexia had arrhythmia, and therefore arrhythmia did not occur. But, this ignores the fact Dr. Alexia McKnight is a Veterinarian and very likely to know the difference between an occasional and insignificant PVC compared with PVC's that are occurring so frequently that there were "more skipped beats than beating beats" (Tr. 4/10 at 12:13-14). Or that Dr. L. McKnight testified to the fact that he observed the arrhythmia (Tr. 4/10 at 126:20-22). PECO's arguments do not explain why Alexia went to see a cardiologist in the first place. And, they completely ignore the plethora of Alexia's other symptoms occurring during this same period such as severe headaches which were also occurring at increased severity and frequency, or her unusual and severe Insomnia that also started with installation of the meter.

Dr. Israel never even asked for more medical records (Tr. 4/13 at 269:21-270:1; Tr. 4/13c at 269:10-15), and became significantly confused over event timing of the records he did review as explained in our

Main Brief at page 34, section 6.2.2.4.5, and in the section of this reply brief under the reply regarding Dr. Alexia McKnight's testimony. And, he testified that he did not take a history or examine Alexia (Tr. 4/13 at 239:11-12; 4/13c at 238:25).

So, under any evaluation of 'Preponderance of Evidence' Dr. Israel's testimony added minimal weight on PECO's side. He most certainly did not counter the 'preponderance of evidence' provided by 3 other physicians. Dr. Israel testified that he did not know what was causing Alexia's symptoms (Tr. 4/13 at 239:4-7; Tr.4/13c at 238:18-21), and stating clearly that it would be inappropriate for him to make a suggestion on what to do in this case (Tr. 4/13 at 231:11-14; Tr. 4/13c at 230:25-231:3).

That is hardly a rebuttal.

CONCLUSION

The Commission has held that in smart meter matters, "[t]he ALJ's role in the proceedings 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 will constitute unsafe or unreasonable service in violation of Section 1501 under the circumstances in this case." *Kreider v. PECO Energy Company*, Docket No. P-2015-2495064 (Opinion and Order, January 28, 2016) at 23.

As discussed in our Main Brief under the section of Burden of Proof, while we disagree in principle that we should have to even establish burden in this way to request consideration for a medical safety exception, we recognize that this has been this courts bar.

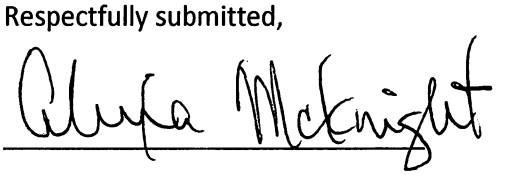
We submit that we have well exceeded this burden of proof anyway. Quite simply "there is more than sufficient evidence to support a finding that Alexia was adversely affected by PECO's AMI meter and that therefore PECO's use of another AMI meter will constitute unsafe or unreasonable service in violation of Section 1501." This experiment has been performed on Alexia on 2 occasions already and 3 separate physicians testified to the results of that experiment. The meter already caused harm in Alexia. She deserves appropriate and reasonable accommodation.

We also respectfully submit that according to PECO's altered definition that we also "did prove, by preponderance of the evidence that PECO's AMI meter did cause, contribute to, and exacerbated Dr. Alexia McKnight's illness" and according to the specified definitions of "Burden of proof" to mean 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).

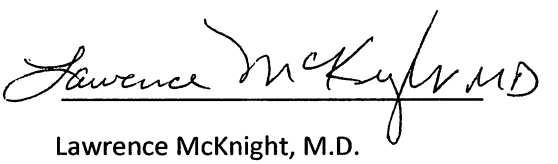
That accommodation is clearly possible by large utilities is demonstrated by the many other states that do provide alternative communication methods or opt outs. Other states have found this clearly feasible to do this and at a reasonable fee, or even free for those with medical exception as noted in the Duke Energy ruling above.

If a complainant establishes a *prima facie* case, then the burden of going forward with the evidence shifts to the utility and if the utility does not rebut the evidence, the complainant will prevail. PECO has not rebutted our evidence.

Respectfully submitted,



Alexia McKnight, D.V.M.



Lawrence McKnight, M.D.