

No. 67315-7-I

**IN THE COURT OF APPEALS
OF THE STATE OF WASHINGTON
DIVISION I**

CATHERINE LAKEY, a single woman; GERTHA RICHARDS, a single woman; MICHAEL HESLOP, a single man; TROY FREEMAN and CAROLINA AYALA de FREEMAN, husband and wife; PATRICK MCCLUSKY and MICHELLE MCCLUSKY, husband and wife; SHAHNAZ BHUIYAN and ANN RAHMAN, husband and wife; STEVE RYAN and NORA RYAN, husband and wife; KEVIN CORBETT and MARGARET CORBETT, husband and wife; KATHRYN MCGIFFORD, a single woman; and JACQUELYN MILLER, a single woman,

Plaintiffs/Appellants,

v.

PUGET SOUND ENERGY, INC., a Washington corporation; and CITY OF KIRKLAND, a Washington municipal corporation,

Defendants/Respondents.

BRIEF OF RESPONDENT PUGET SOUND ENERGY, INC.

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I. INTRODUCTION

Since the 1990s, courts have rejected EMF-based claims for lack of scientific support. In a landmark 1996 case, California's highest court comprehensively analyzed various claims based on EMF and dismissed them as a matter of law. *San Diego Gas & Elec. Co. v. Superior Court*, 920 P.2d 669, 687, 55 Cal. Rptr. 2d 724 (Cal. 1996). The *San Diego Gas & Electric* court painstakingly discussed the scientific, regulatory and legal issues involved in such lawsuits. Remarkably, not a single citation to this case exists in Homeowner's opening brief, even though it was central to PSE's motion to dismiss.

Appellants are homeowners in Kirkland, Washington, who sued Respondent Puget Sound Energy, Inc. (PSE), alleging that electromagnetic fields ("EMF") from PSE's substation constitutes nuisance and trespass on their property. Appellants ("Homeowners") seek review of the trial court's Summary Decision, in which the court: (1) found that Homeowners' expert testimony did not meet the *Frye* standard; and (2) granted PSE's motion to dismiss the nuisance and trespass claims.

II. ASSIGNMENTS OF ERROR

Homeowners assign error to three aspects of the trial court's Summary Decision. Br. of Appellants at 5.

1. Whether the trial court applied the correct standard for pleading a nuisance claim.

2. Whether the trial court erred when it found that neither Dr. Carpenter's theory nor his methodology met the *Frye* standard for general acceptance in the scientific community.

3. Whether the trial court erred in granting summary judgment to the City of Kirkland.

III. STATEMENT OF THE CASE

A. EMF Are Ubiquitous in Modern Society.

EMF are omnipresent in everyday life. EMF are produced by every living thing, as well as by any appliance that utilizes electricity. *San Diego Gas & Elec.*, 920 P.2d at 673. The Earth itself has a strong magnetic field. *Id.* at 674. These naturally occurring fields are at least 100 times more intense than those that can be induced by exposure to common electric power-frequency fields. *Id.* In addition to natural sources, "there are electric and magnetic fields wherever there is electric power." *Id.* at 678. This is true in offices, homes, industry, schools, and public places like libraries, restaurants, supermarkets, and shops.

EMF levels from appliances in the home can range from 1 milligauss (mG) up to several thousand mG. CP 550, 556. Another common source of EMF is electric wiring in the walls, ceilings, and floors

of homes, businesses, and schools. *San Diego Gas & Elec.*, 920 P.2d at 677; CP 550. Home water pipes can be significant sources of EMF, as many electrical systems are grounded to them. RP 4/26 p.m. at 77.

People typically have a continuous range of EMF exposures throughout the day. CP 550-51. Exposure to EMF above and below 1 mG is a routine aspect of daily life. CP 551. EMF levels in public locations, such as stores, libraries, restaurants, courthouses, and hospitals range from below 1 mG to over 1,600 mG. CP 550-51, 558. EMF levels measured in public locations in Kirkland in 2010 ranged from below 1 mG to over 600 mG, and averaged 3.8 mG. CP 551-52, 560. These are typical levels across the United States. CP 551-52.

The EMF levels from PSE's substation and power lines as measured at the property lines of Homeowners' properties are approximately 7 to 10 mG, depending on location. RP 4/27 at 19, 22-23. There is nothing unusual about these EMF, which are representative of levels from other substations. CP 553. These levels are well within the range of fields that people experience in their normal daily environments, including in Kirkland. CP 551-53. These levels also are significantly lower than the public exposure limits adopted by international expert organizations, whose recommended public limits range from 2,000 mG to over 9,000 mG. CP 552; RP 4/27 at 8-9.

Although all human beings are subject to EMF exposure to some degree, 43.5 percent of the American public have average daily EMF exposure over 1 mG (the “level of concern” advocated by Homeowners’ expert Dr. Carpenter). RP 4/26 p.m. at 89. This equals some 140 million people, all of whom ostensibly would have nuisance and/or trespass claims under the arguments Homeowners make here. *Id.*

B. EMF Science and Regulatory Background

1. EMF Research and Science

Scientists have conducted vast research on EMF and health, including epidemiology (statistical) studies and controlled laboratory research. CP 567-68, 576-79. The handful of studies presented by Homeowners is only a very small and selective portion of the much larger body of EMF research.

a. Childhood Leukemia Research

One area of EMF research that has attracted attention is the research on childhood leukemia. CP 576-77. The early epidemiology studies on EMF and childhood leukemia had substantial limitations. Some reported positive associations for some estimates of EMF exposure but not for other types of exposure estimates. Other studies did not find associations. Subsequent studies in the 1990s improved on some aspects of study design, but the results were inconsistent and limited. CP 576-77.

A more recent generation of major studies conducted in the United States, United Kingdom and Canada included larger groups of study subjects, improved design, and used more reliable measures of EMF exposure. These studies found no consistent statistically significant associations between EMF and childhood leukemia. *Id.*

Several “pooled-analysis” studies (a type of “meta-analysis”) have combined original data from previously conducted epidemiology studies on EMF and childhood leukemia to create larger sets of data for statistical analysis. CP 577. Based on reanalysis of the combined data, each of the pooled-analysis studies reported a weak association between childhood leukemia and magnetic fields. A more recent pooled-analysis of six studies published since 2000 and one unpublished study did not find an association between EMF and childhood leukemia. CP 577. Pooled-analysis studies have significant methodological limitations. These include the problem of combining data from studies that had different designs and used widely differing methods for many aspects of exposure assessment, data collection and analysis. One analysis has questioned whether the pooling of data from multiple studies that used widely different methods of EMF exposure assessment is reliable. The authors of the pooled-analysis studies on EMF and childhood leukemia themselves

urged the need for caution in interpreting their results, and stressed that “the inconclusiveness of our results seems inescapable.” CP 577.

b. Adult Cancer and Neurodegenerative Disease

There have been many epidemiology studies of EMF and adult cancers, such as leukemia and brain cancer. CP 577-78. A recent meta-analysis of 56 adult leukemia studies found no pattern of increased risk related to increased EMF exposure (*i.e.*, no dose-response) and found that the more recent studies provided “little indication” of increased risk. Similar results were found for 48 adult brain cancer studies. CP 577-78. There also have been a number of epidemiology studies of EMF and neurodegenerative diseases, such as Alzheimer’s disease, amyotrophic lateral sclerosis (ALS, also known as Lou Gehrig’s disease) and senile dementia, and studies of potential reproductive effects. CP 578.

c. Cell and Animal Studies

In addition to epidemiology studies, there is a large body of laboratory studies on cells and animals exposed to EMF. CP 567. This research is highly relevant to the question of EMF and cancer causation. CP 567, 578-79. Many dozens of studies have examined whether power frequency EMF have the ability to cause the permanent damage to DNA or chromosomes that causes a normal cell to become a cancer cell. CP 567-68. Many of these studies have involved EMF exposures at hundreds

or thousands of mG. No consistent or reproducible effects have been shown.¹ CP 567-68.

The whole animal studies examined whether prolonged exposures to EMF affected the development of cancer or other adverse effects in laboratory animals. CP 567. In the long-term studies, the animals typically have prolonged exposures to EMF, often throughout their lives and sometimes over multiple generations. In the late 1990s, as part of a national research program on EMF, the United States National Toxicology Program (NTP) conducted large, well-designed studies using standard NTP methodologies for long-term animal studies. The NTP studies included animals with continuous exposure to thousands of mG of EMF for up to two years (most of their lives). These studies also involved a broad range of non-cancer health evaluations, including developmental, immunological, and multigenerational reproductive toxicology. The NTP studies found that long-term EMF exposures caused no consistent adverse health effects in the exposed animals. CP 568-69.

Similar results were found in long-term animal studies conducted by independent laboratories in other countries, including Australia, Canada, Europe and Japan. CP 568-69. Additional whole animal studies

¹ Replication of results is a key concept in scientific research. Findings reported in any particular study cannot be considered scientifically reliable in the absence of robust results that can be reproduced consistently. CP 567.

have examined whether EMF can contribute to other aspects of cancer development, such as cancer promotion or progression. These studies found no promotion or progression of cancer, including leukemia, in animals exposed to EMF. CP 568-69.

d. National and International Review

The United States National Institute of Environmental Health Sciences (NIEHS) and the World Health Organization (WHO) have conducted detailed reviews of this extensive body laboratory research and found that the animal and other laboratory research does not provide consistent or compelling results to show that exposure to EMF is involved in the development of cancer or other illness. CP 578-79. NIEHS found that “[v]irtually all of the laboratory evidence in animals and humans and most of the mechanistic work done in cells fail to support a causal relationship between exposure to ELF-EMF at environmental levels and changes in biological function or disease status.” NIEHS also concluded that it would not rank EMF as an exposure “reasonably anticipated” to be a cause of cancer (NIEHS 1999). CP 578-79.

In 2007, WHO conducted an extensive review of EMF research. CP 579. The review found “inadequate evidence” to conclude that EMF causes or contributes to almost all health endpoints examined. WHO noted that there was only “limited evidence” of an association from the

childhood leukemia studies, and that no cause and effect relationship had been demonstrated. WHO found that the “animal and laboratory studies fail to demonstrate any reproducible effects that are consistent with the hypothesis that fields cause or promote cancer.” WHO also concluded there was “inadequate evidence” for an association between EMF and all other childhood cancers, all adult cancers and other adult health conditions such as cardiovascular and neurodegenerative diseases, and adverse reproductive outcomes. WHO currently reports that “*to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health.*” CP 579 (emphasis added).

2. EMF Regulatory Activity

Neither the federal government nor any of the 50 states has adopted health-based standards to limit EMF exposure. RP 4/27 p.m. at 7, 11, 12. No state has adopted the 1 mG limit advocated by Dr. Carpenter. *Id.* at 11-12. Two states (New York and Florida) have “status quo” edge of right-of-way (ROW) standards of 200 mG and 150-250 mG, respectively. *Id.* at 7-8. These standards were adopted decades ago and neither has changed. *Id.* at 8. Washington does not regulate public exposure limits for EMF. *Id.* at 7.

Two respected international expert groups have developed EMF exposure guidelines for the public. CP 552. The International

Commission on Non-Ionizing Radiation (ICNIRP) recommends that public exposures to power frequency (60 Hz) EMF should not exceed 2,000 mG. *Id.* The IEEE has adopted public exposure standards of 9,040 mG for 60 Hz EMF. *Id.*

The Vermont Public Service Board (PSB) has reviewed numerous EMF studies and heard substantial testimony about claimed health effects. *In re Vermont Elec. Power Co., Inc.*, 895 A.2d 226, 179 Vt. 370, 372-375 (Vt. 2006). The PSB concluded “the scientific evidence of any health risk was weak to nonexistent....” *Id.* at 375, 380 (referencing the 1999 NIEHS report cited by Homeowners here). The PSB further found “there was no evidence of any substantial linkage between EMF exposure and childhood leukemia or other cancer risks.” *Id.* at 380.

The Public Utilities Commission (PUC) in Pennsylvania recently addressed the EMF health claims raised by Homeowner’s expert Dr. Carpenter. In 2010, the PUC reviewed an extensive evidentiary record (which included testimony by the experts involved in this case) and adopted *inter alia* the following findings about EMF health claims:

[T]here is no reliable scientific basis to conclude that exposure to power frequency EMF from the proposed S-R Line will cause or contribute to adverse health effects in children or adults along the proposed route of the line.

The record evidence shows that *Dr. Carpenter's opinions were flawed and were not based on a reliable and objective review of the scientific research.*

In light of this overwhelming evidence, there is no good basis to give any weight to Dr. Carpenter's extreme views.

Pennsylvania Public Utilities Commission, A-2009-2082652, Opinion and Order, January 14, 2010, at 111-12 (emphasis added).²

C. The Juanita Substation and Homeowners' Lawsuit

Since 1958, PSE has operated its Juanita Substation on property it owns in Kirkland. CP 29. The substation delivers electric power to local neighborhoods. In response to Kirkland's expanding electrical needs, PSE proposed increasing the capacity of the Juanita Substation, but the existing substation did not comply with current Kirkland zoning regulations. CP 29. PSE proposed rebuilding the substation on a different part of PSE's property next to existing transmission and distributions lines. CP 27. During the permitting process, a substantial SEPA review was conducted, including public hearings, in which some Homeowners participated. CP 29. The City of Kirkland Planning and Community Development Department issued its findings and recommendations on November 25, 2008. CP 26-28. The City adopted the staff report that expressly

² The relevant portions of the Pennsylvania PUC's Opinion and Order are attached as Appendix A. A full version of the Opinion and Order is available on the web by visiting <http://www.puc.state.pa.us/general/search.aspx>, and entering the docket number, date and title into the relevant fields.

discussed EMF and found that the project “will not create any known environmental health hazards” and “PSE’s substation, transmission and distribution facilities are designed, constructed, and operated in accordance with all applicable federal, state, and local regulations and safety codes.” CP 57. The staff report noted that the consensus of the scientific community is that “there is no basis from which to conclude the exposures to EMF cause adverse health effects.” CP 57.

In January 2010, the new substation went on line. CP 3. It contains power lines that operate at a frequency of 60 Hz. CP 3-4. As discussed above, prior to the substation expansion, there were pre-existing power lines adjacent to Homeowner’s properties. These included a 115 kilo-volt (kV) transmission line and two 12 kV distribution lines. RP 4/27 at 14. These pre-existing power lines had been in place for 30-40 years before the substation upgrade.

Prior to the upgrade, EMF levels from existing transmission and distribution lines ranged, at the edges of the ROW, from 7.4 mG to 22 mG. RP 4/27 at 15. Thus, for decades before the upgrade, EMF levels at the edges of Homeowners’ properties were substantially above the 1 mG “level of concern” advocated by their expert. When the new substation was constructed, the existing power lines were removed and the distribution lines were run underground. *Id.* at 19. After construction,

EMF levels measured at the edges of the ROW range from 6.2 mG-11.6 mG. *Id.* at 22. Thus, although there were some changes in EMF levels at specific locations (either decreases or small increases depending on proximity to the substation), the overall EMF levels at the ROW edges have decreased due to the new substation design and construction. *Id.* at 22-24. These levels are expected to decrease even further as additional distribution feeders are attached to the substation in the future. *Id.* at 88.

In September 2010, Homeowners sued PSE, alleging the EMF generated by the substation expose them to radiation levels that are: “injurious to the health of Plaintiffs and their families,” cause physical injury to Plaintiffs,” and “create[] a condition injurious to the health of Plaintiffs and particularly Plaintiff’s children.” CP 4. They alleged that “[a]s a product of the operation of power lines at a frequency of 60 Hz, electromagnetic fields are generated which intrude into the properties owned by Plaintiffs.” *Id.* Homeowners further alleged the proximity of the substation to their homes has reduced their property values because of “apprehension regarding the health effects of electromagnetic radiation.” *Id.* The complaint contained two causes of action, nuisance and trespass. *Id.* Homeowners subsequently amended their complaint to seek damages for inverse condemnation against the City. CP 1028.

D. Procedural History

1. Motion to Dismiss

PSE moved to dismiss Homeowners' nuisance and trespass claims. CP 6. PSE contended that the presence of EMF could not support a trespass claim, as EMF do not compromise Homeowners' exclusive right to possession of their land. Nor could the presence of EMF support a nuisance claim, because EMF do not substantially and unreasonably interfere with the use and enjoyment of Homeowners' property.

The trial court conducted a hearing on PSE's motion to dismiss on December 3, 2010, and gave Homeowners an opportunity to "submit evidence establishing some scientific basis for their claims." CP 185.

2. The Trial Court Entertained Substantial Post-Motion to Dismiss Briefing

After Homeowners filed a motion to reconsider, which was denied, they submitted the declaration testimony of two experts, Dr. Li and Dr. Carpenter, in response to the Court's order. CP 186-313, 418-67, 648-60. PSE objected that the proffered testimony did not satisfy the admissibility standards in *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923), that such evidence had to be reliable and generally acceptable in the scientific community. The Court ordered a *Frye* hearing for April 25-27, 2011. CP 645-47. The parties engaged in significant motion practice after

this order.³ Homeowners subsequently withdrew Dr. Li as an expert.⁴

Thus, their only remaining expert was Dr. Carpenter.

3. The Three-Day *Frye* Hearing.

In early April 2012, each party submitted further briefing on the admissibility of Dr. Carpenter's evidence. CP 1031-148, 1149-58. From April 25 through April 27, the trial court heard the testimony of four expert witnesses, considered a number of exhibits, and heard argument of counsel about Dr. Carpenter's novel EMF theories and methodology. *See generally* RP 4/25, RP 4/26 a.m., RP 4/26 p.m., RP 4/27.

4. The Trial Court Found Dr. Carpenter's Testimony Did Not Meet the *Frye* Standard or ER 702 and Granted PSE's Motion to Dismiss.

The trial court correctly determined that neither Dr. Carpenter's theory nor his methodology met the *Frye* standards for admissibility.

In this case, the critical issue is not just a difference of opinion. Plaintiff's [sic] expert opinion, or ultimate conclusion, is a minority view that is not generally accepted in the relevant scientific community. Dr. Carpenter's methodology for arriving at his opinion is incomplete at best. Dr. Carpenter, who is not an epidemiologist, disregards and dismisses the majority of studies that find no evidence or insufficient evidence to conclude that EMFs, at the level found on Plaintiff's [sic] property, cause diseases

³ Although none of these motions are the subject of this appeal, they reflect the trial court's careful orchestration of and preparation for the *Frye* hearing. CP 897-900, 1022-23; CP 1159-61; CP 1397-98; CP 809-15; CP 1020-21.

⁴ Homeowners withdrew Dr. Li as an expert because they did not want PSE to depose him. The Court therefore should reject Homeowners' attempts to rely on his declaration on appeal.

such as leukemia. The failure to address the majority of studies that do not find reliable evidence of adverse effects from EMF exposure is inconsistent with how epidemiological research is evaluated.

In addition, to his methodology of approach, Dr. Carpenter is not able to state to a reasonable degree of medical certainty that EMF at any level *causes* leukemia, Alzheimer's disease, or ALS. At most, he was able to state that he believed there was a statistically significant association or correlation between EMF and the diseases mentioned despite there being no animal studies to support the conclusion or no single mechanism that explains how EMF causes such diseases.

CP 1420 (emphasis in original). Without any admissible scientific evidence to address whether the law should change, the trial court granted PSE's motion to dismiss all claims against PSE as a matter of law, without addressing whether that evidence, if admitted, warranted reconsideration of *San Diego Gas & Electric* and similar decisions in other jurisdictions. CP 1644-45.

IV. ARGUMENT

PSE presented the trial court with alternative bases for dismissal of the nuisance claim, each of which are supported by the record and may form the basis for this Court to uphold the dismissal. *Wendle v. Farrow*, 102 Wn.2d 380, 382, 686 P.2d 480 (1984) (a trial court judgment may be affirmed by any basis supported by the record). First, courts have rejected nuisance and trespass claims based on EMF exposure even when

considering *admissible* scientific evidence. Homeowners produced no admissible scientific evidence to suggest the trial court should ignore the longstanding legal doctrine rejecting EMF-based nuisance claims.

Second, RCW 7.48.160 provides that an action required by law cannot constitute a nuisance, and PSE is required by law to produce electricity at 60 Hz, which necessarily creates EMF. Third, Homeowners had no admissible evidence of injury or harm, as the trial court properly excluded Dr. Carpenter's testimony under both *Frye* and ER 702.

A. Standards of Review

This Court reviews de novo a trial court's CR 12(b)(6) dismissal of a cause of action. *San Juan County v. No New Gas Tax*, 160 Wn.2d 141, 164, 157 P.3d 831 (2007). Questions of admissibility under *Frye* are reviewed de novo. *Anderson v. Akzo Nobel Coatings, Inc.*, 172 Wn.2d 593, ¶ 7, 260 P.2d 857 (2011); *State v. Copeland*, 130 Wn.2d 244, 255, 922 P.2d 1304 (1996). Whether expert testimony is admissible under ER 702 is within the discretion of the trial court, and this Court does not disturb the trial court's decision absent an abuse of discretion. *State v. Swan*, 114 Wn.2d 613, 655, 790 P.2d 610 (1990), *cert. denied*, 498 U.S. 1046, 111 S. Ct. 752, 112 L. Ed. 2d 772 (1991).

B. Courts Since the 1990s Have Upheld Dismissals of EMF Nuisance and Trespass Claims.

1. Nuisance Claims Fail as a Matter of Law.

Courts consistently have held that the scientific evidence does not show any substantial linkage between EMF and childhood leukemia or other cancer risks, precluding nuisance claims based on fear of physical harm. The *San Diego Gas & Electric* plaintiffs' claims were nearly identical to the claims in this case. Their complaint alleged causes of action for nuisance, personal injury, trespass and inverse condemnation based upon exposure to EMF.⁵ 920 P.2d at 679. The court affirmed dismissal of all these claims as a matter of law. *Id.* at 673, 679-80, 696-97, 697-700. With respect to the nuisance claim, the Court articulated the variety of reasons supporting dismissal:

As we have seen, in order to award such damages on a nuisance theory the trier of fact would be required to find that reasonable persons viewing the matter objectively (1) would experience a substantial fear that the fields cause physical harm and (2) would deem the invasion so serious that it outweighs the social utility of SDGE&E's conduct. Such findings, however, would be inconsistent with the commission's conclusion, reached after consulting with DSHS, studying the reports of advisory groups and experts, and holding evidentiary hearings, that the available evidence does *not* support a reasonable belief that 60 Hz electric and magnetic fields present a substantial risk of physical harm, and that unless and until the evidence

⁵ Plaintiffs abandoned any claims related to personal injury on appeal, and claimed only to be seeking diminution in property value based upon the general public's "reasonable fear of EMF." *Id.* at 694.

supports such a belief regulated utilities need take no action to reduce fields from existing powerlines.

920 P.2d at 697 (emphasis in original). No published decision in the intervening 16 years has questioned the legal rationale or scientific basis for the *San Diego Gas & Electric* result. If anything, the scientific evidence has grown stronger that there can be no reasonable belief that power line EMF causes health effects. See RP 4/26 p.m. at 14-16.

Two significant decisions in 1995 also held nuisance claims based on EMF were not viable. The Georgia Court of Appeals affirmed a directed verdict on plaintiff's nuisance claims. *Jordan v. Georgia Power Co.*, 466 S.E.2d 601, 219 Ga. App. 690, 692 (Ga. Ct. App. 1995). The court held a directed verdict on the EMF-based nuisance claim was proper because "the present state of science does not authorize recovery based on these facts." *Id.* at 695. In *Borenkind v. Consol. Edison Co. of New York*, 164 Misc. 2d 808, 810, 626 N.Y.S.2d 414 (N.Y. Sup. Ct. 1995), the court dismissed the nuisance claim outright, because medical science did not support a nuisance theory based on EMF: "since [EMFs are] unperceptible [sic] to the ordinary senses and there being evidence presented that science is unable to yet conclude whether or not harm from them results, the invasive quality of electrical and magnetic fields as a

nuisance...is fatally impaired.” *Id.*; see also *Edgcomb v. Lower Valley Power & Light, Inc.*, 922 P.2d 850, 859-60 (Wyo. 1996).

Homeowners have identified no case in which a court awarded any relief for nuisance claims based on EMF. Rather than addressing the many cases PSE cited, Homeowners rely on *Indiana Michigan Power Co. v. Runge*, 717 N.E.2d 216 (Ind. Ct. App. 1999). *Runge* is distinguishable, as it involved Indiana’s specific standard for nuisance claims brought against utility companies related to their use of easements. That standard prevents recovery if the utility “uses due care and caution regarding the rights of the neighboring owners.” *Id.* at 228. The “due care” standard demanded both a factual inquiry on the utility’s decision making process, as well as an examination of the scope of the utility company’s easement over plaintiffs’ property—an issue absent from this case. *Id.* at 221, 228. These two factual issues prevented summary judgment dismissal of the nuisance claim. *Id.* at 228-229. *Runge* does not stand for the proposition that Homeowners are entitled to relief for the presence of EMF on their property; nor does it undercut Washington’s nuisance law discussed below.

2. The Court Did Not Err in Dismissing Homeowners' EMF Trespass Claims.

Although Homeowners have not appealed the dismissal of their trespass claims, courts' resounding rejection of EMF-based trespass claims supports dismissal.⁶ *See, e.g., San Diego Gas & Elec.*, 902 P.2d at 695-96; *Beal v. W. Farmers Elec. Co-op.*, 228 P.3d 538, 541, 2010 Ok. Civ. App. 6 (Ok. Civ. App. 2009), *reh'g denied* (Nov. 12, 2009); *Reiss v. Consol. Edison Co. of New York Inc.*, 228 A.D.2d 59, 61-62, 650 N.Y.S.2d 480 (N.Y. App. Div. 1996); *Georgia Power Co.*, 466 S.E.2d at 606.

C. PSE Is Required by Law to Operate Its Power Lines at 60 Hz.

Homeowners alleged that operation of power lines at 60 Hz produces EMF that constitute a nuisance. CP 4. Homeowners' allegations failed to state a viable nuisance claim, because an action expressly authorized by statute cannot be a nuisance. RCW 7.48.160 provides that:

Nothing which is done or maintained under the express authority of a statute, can be deemed a nuisance.

⁶ Homeowners do not argue the trial court erred in dismissing the trespass claim, nor do the assignments of error identify trespass. To the extent any of the assignments of error are intended to address the trespass claims, Homeowners have waived their right to argue that issue. A party's failure to assign error to or provide argument in support of an assignment of error precludes appellate consideration of an alleged error. RAP 10.3; *Hollis v. Garwall, Inc.*, 137 Wn.2d 683, 689 n.4, 974 P.2d 836 (1999); *Cowiche Canyon Conservancy v. Bosley*, 118 Wn.2d 801, 809, 828 P.2d 549 (1992).

Although an action that is lawful in a general sense may still be a nuisance, an action expressly required by law cannot. *See Grundy v. Thurston County*, 155 Wn.2d 1, 6-7, 7 n.5, 117 P.3d 1089 (2005); *Deaconnes Hosp. v. Washington State Highway Comm'n*, 66 Wn.2d 378, 408-09, 403 P.2d 54 (1965).

The Washington Utilities and Transportation Commission (WUTC) in its expertise, has determined that 60 Hz is the optimal operating frequency for producing electricity. The WUTC *requires* electric utilities, including PSE, to operate all power lines at 60 Hz:

[a]ny electric utility supplying alternating current *must* design and maintain its distribution system for a standard operating frequency of sixty cycles per second under normal operating conditions.

WAC 480-100-368 (emphasis added). Given WUTC's express requirement that power lines operate at 60 Hz (which necessarily produces EMF), PSE has no option but to comply with the requirement and would face penalties if it did. WAC 480-100-003(4). PSE's action is not only expressly authorized by statute, it is required by regulation. RCW 80.01.040(3); WAC 480-100-368. Thus, RCW 7.48.160 precludes Homeowners' nuisance claim as a matter of law. *See, e.g., Beal*, 228 P.3d at 541 (affirming summary dismissal of nuisance claim based on presence of EMF, under an Oklahoma statute identical to RCW 7.48.160).

Although the trial court did not address this basis for dismissal, this Court may affirm on any ground supported by the record. *Wendle*, 102 Wn.2d at 382.

D. The Trial Court Did Not Err in Granting PSE's Motion to Dismiss, Because Homeowners Could Not Plead Any Cognizable Injury or Harm Based on EMF.

An actionable nuisance, whether public or private, is defined as “whatever is injurious to health or indecent or offensive to the senses, or an obstruction to the free use of property, so as to essentially interfere with the comfortable enjoyment of the life and property.”⁷ RCW 7.48.010. Regardless of the type of the interference claimed, the interference must be both substantial and unreasonable. *Grundy*, 155 Wn.2d at 6. Homeowners failed to demonstrate any cognizable injury whatsoever.

1. The Trial Court Properly Determined Dr. Carpenter's Testimony Was Inadmissible Under *Frye* and ER 702.

Although Homeowners now claim they only based their nuisance claims upon “reasonable apprehension,” the majority of their allegations were that EMF are injurious to their health. CP 4. This injury to health alleged in the complaint was purely hypothetical. They did not and could

⁷ Homeowners did not allege EMF were indecent or offensive to the senses. See CP 3-4. EMF from the substation in this case are imperceptible. Nor did they allege any legally cognizable injury to property. They allege that “apprehension” by “the public” of EMF due to the presence of the substation has reduced the fair market value of their property, but they plead no other damages. CP 4. Loss of property value by itself, however, is insufficient to create an actionable nuisance. *Morin v. Johnson*, 49 Wn.2d 275, 282, 300 P.2d 569 (1956). Lost property value may be used as a measure of damages once actual damage is otherwise proved. See *id.*

not allege that EMF from 60 Hz power lines actually are carcinogenic. They alleged only that EMF are “probable” carcinogens.⁸ CP 4. Nor did they allege that any plaintiff has cancer caused by EMF. CP 4. Instead, they relied solely on the testimony of Dr. Carpenter.

To be admissible, expert testimony must satisfy both the standard in *Frye* and ER 702. See *State v. Copeland*, 130 Wn.2d 244, 256, 922 P.2d 1304 (1996). The trial court properly determined Dr. Carpenter’s testimony was inadmissible under both standards.

a. The *Frye* Standard: General Acceptance

Under *Frye*, the primary goal is to determine “whether the evidence offered is based on established scientific methodology.” *State v. Gore*, 143 Wn.2d 288, 302, 21 P.3d 262 (2001). The inquiry into methodology under *Frye* is a two-part test. Courts consider: “(1) whether the underlying theory is generally accepted in the scientific community and (2) whether there are techniques, experiments, or studies utilizing that theory which are capable of producing reliable results and are generally accepted in the scientific community.” *State v. Riker*, 123 Wn.2d 351, 359, 869 P.2d 43 (1994).

⁸ This allegation is plainly false. Homeowners now contend that EMF has been listed as a “possible” carcinogen. Br. of Appellant at 2. Many common substances have been identified as “possible” carcinogens, such as coffee and the smoke from fireplaces in homes. RP 4/25 at 144-45, RP 4/26 p.m. at 36-37.

Acceptance within the scientific community requires courts to look not only to acceptance in the forensic setting, but also in the wider scientific community familiar with the theory and underlying technique. *See State v. Cauthron*, 120 Wn.2d at 879, 896-97, 846 P.2d 502 (1993). If there is a significant dispute between qualified experts as to the validity of scientific evidence, the evidence may not be admitted. *Copeland*, 130 Wn.2d at 255; *Cauthron*, 120 Wn.2d at 887. As explained by the Washington Supreme Court:

The trial court's gatekeeper role under *Frye* involves by design a conservative approach, requiring careful assessment of the general acceptance of the theory and methodology of novel science, thus helping to ensure, among other things, that "pseudoscience" is kept out of the courtroom.

Copeland, 130 Wn.2d at 259. The *Frye* general acceptance standard is a measure of whether novel scientific evidence or theories, such as offered by Dr. Carpenter in this case, have a reliable or valid scientific basis. *Reese v. Stroh*, 128 Wn.2d 300, 306, 907 P.2d 282 (1995).

b. Dr. Carpenter's Novel Theory that EMF Can Cause Health Effects Is Not Generally Accepted.

Dr. Carpenter's opinion in this case is based on his novel theory or proposition that exposure to very low level EMF (above 1 mG) can cause cancer and other adverse health effects. A very large amount of scientific research has been conducted on EMF over the past 30 years. Numerous

panels convened by government agencies and public health entities have reviewed that research.

The most recent such comprehensive review of EMF research was conducted by WHO in 2007. CP 579. As discussed above, *infra* at 8-9, WHO found there was “inadequate evidence” that EMF causes or contributes to all adult cancers (leukemia, brain cancer and all other cancers), neurodegenerative diseases (Alzheimer’s and ALS), and adverse reproductive outcomes. *Id.* As to childhood leukemia, WHO saw only “limited evidence” of an association with EMF and emphasized that the scientific research did not show a causal relationship. *Id.* Based on this “limited evidence,” WHO described the relationship as “possible”, but neither established nor even probable. Moreover, WHO concluded the “animal and laboratory studies fail to demonstrate any reproducible effects that are consistent with the hypothesis that fields cause or promote cancer.” *Id.* WHO recommended that regulators around the world adopt EMF exposure limits developed by either ICNIRP (2,000 mG) and IEEE (9,000 mG). RP 4/25 at 94. WHO also expressly recommended against the adoption of lower EMF exposure limits. *Id.* at 102. Dr. Carpenter admitted on cross that WHO’s recommendation directly contradicts his theory that EMF above 1 mG should be avoided. *Id.*

An earlier NIEHS report reached similar conclusions. At the conclusion of a multi-year national research program on EMF, in 1999 the Director of the NIEHS issued a report to Congress, noting “there is only marginal scientific support that exposure to ELF-EMF is a health hazard.” CP 122. The NIEHS noted that it had convened an international panel of 30 scientists to evaluate the scientific research on EMF and that “none of the [scientists] considered the evidence strong enough to label ELF-EMF exposure as a ‘known human carcinogen’ or ‘probable human carcinogen.’” CP 120. The NIEHS independently concluded it would *not* classify EMF as an exposure “reasonably anticipated” to be a cause of cancer. CP 122. Overall, the NIEHS concluded:

[T]he probability that ELF-EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and the lack of any laboratory support for these associations provide only marginal, scientific support that exposure to this agent is causing any degree of harm.

CP 122. Similarly, the United States Environmental Protection Agency reports that “[t]he general scientific consensus is that thus far the evidence available is weak and is not sufficient to establish a definitive cause/effect relationship.” RP 4/26 p.m. at 62-63 (reading EPA document into record).

Given these findings, it would be fanciful to argue there is any general acceptance in the scientific community that very low level EMF

can cause adverse health effects. Homeowner's reliance on the California EMF Program report is misplaced. That report was prepared by three staffers from the EMF Program (two of whom worked for the third) and was not the product of an independent expert scientific panel. RP 4/25 at 153. Further, in preparing their report, these three staffers followed an unusual methodology that has been criticized in the scientific community. *Id.* Instead of scientific conclusions, the report offers only the subjective "inclinations" and "beliefs" of the three authors. The report does not represent a policy view about EMF in California. Although the California Public Utility Commission (PUC) commissioned the report, after receiving it, the PUC did not adopt any EMF exposure limits or any new EMF policies.⁹ RP 4/27 at 12.

Dr. Mark Israel is a preeminent cancer researcher, the director of a major cancer research center, and a scientific advisor to other leading cancer centers, such as the United States National Cancer Institute (NCI) and the National Cancer Institute of Germany. CP 564-67. He testified that there is no general acceptance in the mainstream scientific community that EMF exposures cause any health effects, including cancer.

⁹ Homeowners also argue the EPA, CDC and other government entities recommend people *should* take steps to reduce EMF exposures. This is a mischaracterization of the agency materials, which identify steps that can be taken *if* individuals have concerns.

Q. Would you say that -- is it generally accepted in the cancer research community that EMF causes or contributes to the development of cancer?

A. No. Quite the opposite. I think that people who have thought about this science and are knowledgeable about it are pretty dismissive of it.

....

Q. Is it generally accepted in the scientific community that there are health risks, whether cancer or other, from EMF?

A. It is not.

RP 4/26 a.m. at 33-34. At a minimum, because there is a “significant dispute between qualified experts” regarding the validity of the theory that EMF causes human health effects, Dr. Carpenter’s theory is inadmissible under *Frye. Copeland*, 30 Wn.2d at 255.

c. Dr. Carpenter’s Opinions Are Not Based on Generally Accepted or Reliable Methodology.

Homeowners argue that Dr. Carpenter’s opinions about alleged health effects from EMF must be admissible because he conducted a “literature review” of scientific studies on EMF. Br. of Appellant at 20-21. Under *Frye*, however, the criteria for the reliability and admissibility of expert testimony stand for more than just a simple reading test. Homeowners have the burden of establishing that Dr. Carpenter followed generally accepted methodology in evaluating the scientific research.

The trial court correctly determined that Dr. Carpenter's methodology was deeply flawed and did not follow standards generally accepted in the scientific community. Not only did Dr. Carpenter fail to consider much of the relevant science, his evaluation of the research was characterized by a pattern of identifying and selecting studies and data that supported his views, while ignoring any research that contradicted his preconceived opinions.¹⁰ As PSE's highly experienced and credible medical experts testified, this selective and results-oriented approach falls far short of what is generally accepted in the scientific community as a reliable methodology for evaluating a body of scientific research.

i. Dr. Carpenter Was Deliberately Selective and Incomplete in His Evaluation of the Epidemiology Studies.

Dr. Carpenter's opinions about EMF and disease are based almost entirely on his interpretation of epidemiology studies. Dr. Carpenter does not have a degree in epidemiology or formal post-graduate training in the field. Simply put, he is not an epidemiologist. RP 4/25 at 51. PSE, however presented the expert testimony of Dr. Nancy Lee, who is a

¹⁰ Homeowners attempt to rely on inapposite federal case law applying *Daubert*, as well as on cases that *Daubert* specifically rejected. Br. of Appellant at 20-21; 37-38 (citing *Deluca by Deluca v. Merrill Dow, Inc.*, 911 F.2d 941, 943-944, (3d Cir. 1990) *disapproved of by Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993)).

medical doctor and a highly experienced epidemiologist.¹¹ Dr. Lee had a distinguished career in epidemiology and public health research at Centers for Disease Control, where she conducted epidemiology and public health research, and from 1999-2004 served as Director of the Division of Cancer Prevention and Control.¹² Dr. Lee has designed and conducted numerous epidemiology studies on cancer and other public health issues, and has published over 95 scientific studies in leading scientific journals.

Dr. Lee explained that epidemiology involves the use of statistical analysis to study possible associations between exposures and the occurrence of disease in human populations. CP 575-76; RP 4/26 a.m. at 77. Epidemiology is an “observational” science because scientists generally cannot conduct experiments that would involve exposing human subjects to potentially hazardous agents. CP 575-76; RP 4/26 a.m. at 76-77. As a result, there are many challenges and limitations inherent in epidemiology research, such as estimating past exposures, controlling for confounding variables, addressing unintended biases, and the limitations of statistical analysis. CP 575-76; RP 4/26 a.m. at 78-79. Epidemiologists

¹¹ Shortly before the *Frye* hearing in this case, Dr. Lee was appointed Deputy Assistant Secretary for Health in the United States Department of Health and Human Services. HHS granted permission for Dr. Lee to provide testimony at the hearing. RP 4/26 a.m. at 71.

¹² Dr. Lee’s background and experience as an epidemiologist and public health specialist are addressed in greater detail in her expert declaration. CP 572-75.

therefore have developed a generally accepted methodology for assessing the validity of statistical associations reported in epidemiology studies and determining whether these results indicate actual causal relationships. CP 575-76; RP 4/26 a.m. at 78-79.

A key threshold element of this generally accepted methodology is that an evaluation of a body of epidemiology research on a particular exposure and disease must take into account the results of *all* the pertinent studies. RP 4/26 a.m. at 87-88. A failure to take into account relevant studies and results is a failure to follow generally accepted methodology. *Id.* This is precisely what Dr. Carpenter did repeatedly.

For example, Dr. Carpenter claimed that the epidemiology research provides “very strong” evidence that EMF can cause leukemia in adults. RP 4/25 at 54. For this proposition, he relied on a 1997 “meta-analysis” conducted by Kheifets,¹³ which he said was “probably the best summary” the epidemiology studies on EMF and adult leukemia. *Id.* Kheifets however updated that meta-analysis in 2008. *Id.* at 55. The updated 2008 meta-analysis was much more extensive and included 21 new studies which were not part of the earlier 1997 report. *Id.* at 55-56. The updated meta-analysis found no clear pattern of increased risk. *Id.* at 57. It

¹³ Homeowners make the curious statement that Dr. Lee considers Kheifets “authoritative.” Dr. Lee simply cited Kheifets as the author of several studies.

therefore does not provide any reliable evidence to support a relationship between EMF and adult leukemia. RP 4/26 a.m. at 88. On cross-examination, Dr. Carpenter admitted that he knew about the 2008 Kheifets updated meta-analysis. RP 4/25 at 55. Even though he based his opinion on the earlier Kheifets meta-analysis, he simply disregarded the more extensive and up-to-date 2008 study which contradicted his opinion. *Id.* at 57-58. As Dr. Lee testified, disregarding more recent research that does not “fit” a prior opinion is not a generally accepted methodology for evaluating epidemiology research. RP 4/26 a.m. at 87-88.

- Q. So yesterday, for instance, in talking with Dr. Carpenter, I asked him about the studies that he relied on or cited related to adult leukemia, and he had cited an early meta-analysis but not a later one. And that later one included a lot more studies. Would it be a generally-accepted methodology to review about half the studies on a particular exposure and then base your conclusion on that?
- A. No.
- Q. You have to go get all the studies?
- A. Yep.
- Q. And, in particular, probably the more recent ones because this is a science that builds on itself?
- A. Right. And *he admitted he knew of that study and did not use it, which you just don't do that.*
- Q. You've seen that Kheifets 2008 meta-analysis?
- A. I have.
- Q. And she concluded that when she [added] in the more recent studies, what did she find?

- A. She found there was no reliable evidence to support a relationship between EMF exposure from power lines and adult leukemia.

Id. (emphasis added).

Dr. Carpenter repeated this methodological failure in his evaluation of the epidemiology research on EMF and adult brain cancer. He claimed that low level EMF can cause adult brain cancer and relied on a 1995 meta-analysis by Kheifets. RP 4/25 at 58. Kheifets updated that meta-analysis in 2008. RP 4/25 at 58; CP 577-78. The updated 2008 meta-analysis included many new studies conducted after 1995 and found no clear pattern of risk between EMF exposure and adult brain cancer. RP 4/25 at 59; CP 577-78. Dr. Carpenter ignored this significant update, which contradicted his opinion. RP 4/25 at 59. This is the same methodological flaw that characterized Dr. Carpenter's review of the adult leukemia research. RP 4/26 a.m. at 88.

Dr. Carpenter's habit of ignoring results that do not "fit" his opinions is also displayed in his approach to the epidemiology research on Alzheimer's disease. Dr. Carpenter claimed the epidemiology research provide "strong evidence" of increased risk related to EMF exposure and cited a few studies. RP 4/25 at 127. He simply ignored the remaining studies, which showed no consistent increased risk. As Dr. Lee testified,

ignoring inconsistent studies is not an appropriate methodology for evaluating epidemiology research.

- Q. Dr. Carpenter said that he found a consistent pattern of increased risk in the Alzheimer's studies, and he reported the positive studies. Are there, in fact, studies looking at EMF and Alzheimer's disease that did not find any increased risk or association?
- A. Yes. A number of studies. By Noonan, Graves.
- Q. Just as with the adult leukemia studies and the adult brain cancer studies, would it be an appropriate methodology to base a conclusion without including all of the studies on the topic?
- A. No. And let me just say, Dr. Carpenter's paper was a review article. And in review articles, you usually cite all the papers you've reviewed. You don't necessarily comment on the text. But the way that he wrote, for example, this section on Alzheimer's, it's a strong association. He cited three papers or four papers – I don't remember exactly the number – that showed it was a strong risk factor – those are his words or paraphrases of his words – and ***never discussed these other well-done studies that did not find the same association that did not find that EMF was associated with Alzheimer's disease.***

RP 4/26 a.m. at 90-91 (emphasis added).

Dr. Carpenter's deliberate and misleading use of selective results is further illustrated by his reporting of data from a study on EMF and Alzheimer's disease. He claimed that a study by Qio (phonetically "Chu") showed an increased risk of Alzheimer's disease in workers exposed to

EMF and cited a single data point from that study. RP 4/25 at 128. The specific data he cited were results for only a small subgroup of male workers. RP 4/26 a.m. at 89-90. He did not rely on the results for the much larger group of female workers, which showed no increased risk. *Id.* He also did not report that the study found no increased risk for the workers overall. *Id.* Dr. Carpenter's decision to ignore the data on the female workers was particularly egregious and misleading, because, as Dr. Lee pointed out, these data were readily available in the study (even in the abstract) and were important because women are substantially more likely to develop Alzheimer's than men.

Q. Yesterday I had a discussion with Dr. Carpenter about the Chu [Qio] study on Alzheimer's. Do you recall that?

A. I do.

Q. And in his review, he had presented one odds ratio showing an elevation for men and Alzheimer's disease?

A. Correct.

Q. Were there other data points of significance or importance in the Chu study?

A. Yes. It was actually a study of men and women. And because women are substantially more likely to get Alzheimer's disease, there were many more women in the study. ...And for the women -- which I think there were twice as many women, at least, in the study -- their odds ratio was .8, which is -- it was not statistically significant, but when an odds ratio is below one, it means it's protective.

...

[I]t was in no way an elevation. And, furthermore, if you combined the entire study population, you put the men and women together and computed the odds ratio for men and women together, the odds ratio was .9; again, below one.

...

- Q. So, is it a generally-accepted methodology in reviewing epidemiology results to exclude data points that don't show an association?
- A. No. ... You want to give the full picture of what the study has shown. And I would say ***if you're leaving out more than half of the study subjects and not saying that you did that and implying in the article as he did that this was the result for the entire study, then that's not appropriate methodology.***

RP 4/26 a.m. at 89-90 (emphasis added).

Dr. Carpenter claimed that by far the strongest evidence for EMF health effects is related to childhood leukemia. RP 4/25 at 59. He admitted that "I'm not saying we have proven causation," and described the research as reporting "statistically significant" associations. RP 4/25 at 68. He believed these statistically significant associations were enough to show a causal relationship with childhood leukemia. Dr. Lee testified that "it is a big mistake to equate a statistically significant association with causality. ... That's sort of basic Epidemiology 101." RP 4/26 p.m. at 43.

She emphasized that this is an approach that “no good epidemiologist” would follow.¹⁴ RP 4/26 a.m. at 87.

Dr. Carpenter’s opinions about EMF and childhood leukemia are also based on epidemiology studies that used unreliable methodology. For example, he relied on early studies which used a “wire-code” methodology to estimate EMF exposures. RP 4/25 at 78. This involved researchers visually assessing the “thickness” of power lines near homes and then assuming that a “thicker” power line would mean higher EMF levels. *Id.* at 79. Dr. Carpenter claimed that the wire-code methodology was a reliable estimate of EMF exposure. Subsequent research revealed that the wire-code methodology was unreliable because wire-codes are a “very poor predictors” of magnetic field exposures. RP 4/26 p.m. 85-86.

Dr. Carpenter also relied on a 1993 epidemiology study conducted in Sweden by Feychting. CP 350-364. This study estimated EMF exposures based on calculations of magnetic fields from power lines. The study’s use of this methodology was unreliable, because the researchers often used guesswork about amount of electrical current that had flowed on lines in the past, which lead to “really bad mistakes” in their calculations of EMF levels. RP 4/27 at 52-53.

¹⁴ Given this unambiguous testimony, Homeowners’ claim that Dr. Lee equates statistical significance with causation is preposterous. Br. of Appellants at 41.

Beginning in 2000, much larger studies on EMF and childhood leukemia were conducted in the United States, Canada and the United Kingdom. This research included a nationwide United States study by epidemiologists at the NCI. RP 4/25 at 151-152. These studies used sophisticated meters to actually measure the EMF exposures being experienced by children. RP 4/25 at 152; CP 576-77. In each of these three larger and more sophisticated studies, the researchers found no increased risk of childhood leukemia associated with EMF exposures. RP 4/25 at 153; CP 576-77.

Dr. Lee testified that these three studies were the “highest quality” epidemiology studies conducted on EMF and childhood leukemia, and they found “no statistically significant consistent increased risks in childhood leukemia associated with measured EMF.” RP 4/26 at 8; CP 576-77. Dr. Carpenter was aware of these studies, but did not even address them in his evaluation of the epidemiology research on childhood leukemia. RP 4/25 at 153.

Rather than address these major individual studies on EMF and childhood leukemia, Dr. Carpenter relied on two “pooled-analyses” of childhood leukemia studies. *Id.* at 153. Although pooled-analysis studies can be useful, they have significant methodological limitations, because they try to combine data from multiple studies that used different designs

and widely differing methods of assessing exposures. CP 577; RP 4/26 p.m. at 9-10. Dr. Lee explained that, methodologically, it is not appropriate to base a conclusion about causation on the results of the pooled studies on EMF and childhood leukemia, while ignoring the higher quality and larger individual studies. RP 4/26 p.m. at 8. She also noted that the authors of the pooled-analysis studies themselves cautioned against interpreting their results as showing a causal connection between EMF and childhood leukemia. *Id.* at 10-11.

Put mildly, Dr. Carpenter's evaluation of the epidemiology studies on EMF and childhood leukemia was not based on methodology that is generally accepted in the scientific community.

ii. Dr. Carpenter Completely Ignored the Laboratory Research on EMF.

Dr. Carpenter's disregard for research that does not serve his opinions also is seen in his approach to the non-epidemiological laboratory research on EMF. There is a substantial body of laboratory research on animals and cells exposed to EMF. CP 567-69. For scientists who research the causes of cancer, this is an important body of evidence that is highly relevant to the question of whether EMF can cause or contribute to the development of cancer. RP 4/26 a.m. at 23. This evidence also is important to epidemiologists, because the results of laboratory research

can reveal whether there is any “biological plausibility” to support the statistical associations that may be reported in epidemiology studies. *Id.* at 86-87.

Dr. Carpenter is aware of the existence of this laboratory research. RP 4/25 at 113. He knows that the research includes studies on EMF and cancer initiation, promotion and progression conducted under the standard research protocols developed by the National Toxicological Program. *Id.* He knows that the research includes studies in which animals received continuous exposures of EMF at very high levels (over 10,000 mG) for their entire lifespans. *Id.* He also knows that the research provides no good scientific evidence that EMF causes cancer or leukemia in animals. *Id.* at 110-11. Therefore, he did not rely on any of this research in forming his opinions.¹⁵ Instead, he attempted to dismiss the animal research as essentially irrelevant, on the grounds that “there is no good animal model of leukemia.” *Id.* at 28. Although he could not identify a single study to support that proposition, he nonetheless repeatedly insisted that it was generally accepted in the scientific community that “laboratory rodents don’t get leukemia.” *Id.* at 113, 116.

¹⁵ In his review article, Dr. Carpenter identified a few animal studies which he claimed showed effects from EMF. On cross-examination, he admitted that those studies involved animals exposed to radio-frequency fields, which were not relevant to power line EMF. RP 4/25 at 107-09.

PSE presented the testimony of Dr. Israel, who is a medical doctor specializing in cancer causation and treatment. Dr. Israel is the Director of the Cancer Center at Dartmouth Medical School, a noted cancer research and treatment center. Dr. Israel also heads a cancer research laboratory and is a Professor at Dartmouth Medical School. In addition to conducting research on cancer causation, throughout his career Dr. Israel has been involved in the diagnosis and treatment of cancer patients, including children with cancer.¹⁶ CP 564-67.

Dr. Israel has published over 200 scientific studies on cancer and the molecular genetics of cancer in leading scientific journals. He has served on the Board of Scientific Counselors for the NCI and many other cancer research centers, including Yale Cancer Center, the National Cancer Institute of Germany and the cancer centers at the universities of Nebraska and Wisconsin.¹⁷ CP 564-67.

Dr. Israel testified that the generally accepted methodology for evaluating the potential carcinogenicity of an exposure requires taking into account the results of animal research on that exposure. RP 4/26 a.m. at 23. He explained that the animal research on EMF is a “very important”

¹⁶ By contrast, Dr. Carpenter is not board certified in any medical discipline and has never been licensed to practice medicine. RP 4/25 at 51.

¹⁷ Dr. Israel’s background and experience as a medical doctor and cancer expert are addressed in more detail in his expert declaration. CP 564-67.

body of research to be taken into account in evaluating whether EMF can cause or contribute to the development of cancer. *Id.* at 29-30. He refuted Dr. Carpenter's claimed justification that "rodents don't develop leukemia." *Id.* at 23. He testified it is *common knowledge* in the cancer research community that laboratory rodents develop leukemia and that there are "numerous" accepted models for testing the development of leukemia in laboratory animals.

- Q. Dr. Carpenter mentioned yesterday that he didn't think the animal studies related to EMF were very important, and particularly to the question of leukemia, because rodents don't get leukemia. Let me ask you: Do rodents get leukemia?
- A. Yes, of course.
- Q. And is that a matter of controversy in the cancer research community?
- A. No. It's widely studied and widely known.
- Q. And does that mean that there are accepted animal models for testing the development of leukemia?
- A. Yes. There are numerous animal models of leukemia.

Id. at 23-24.

Dr. Israel noted that there are many well-conducted animal studies on EMF and cancer, including very large studies that involved thousands of animals exposed to high levels of EMF for their entire lifespans. RP 4/26 a.m. at 31-32; CP 568-69. None of these studies found any consistent, repeatable increases in cancers in the animals exposed to EMF,

including leukemia. RP 4/26 a.m. at 31-32; CP 568-69. He emphasized it would be considered “peculiar” in the cancer research community not to consider these studies in evaluating the question of EMF and cancer.

- Q. In the cancer research community, including the community of cancer doctors and cancer prevention in which you are familiar, is it a generally-accepted methodology to ignore the animal research in evaluating whether EMF can cause cancer?
- A. I think anyone -- in the sphere I live in, anyone who did that would be -- it would be found to be very peculiar to not review the animal literature.

RP 4/26 a.m. at 32-33.¹⁸

Dr. Israel’s testimony is substantiated by the methodologies followed in the leading reviews of EMF research conducted by the NIEHS, the National Academy of Sciences (NAS) and WHO, among others. Each of these reviews includes significant discussion of the animal and cellular research and takes the results of that research in account in assessing EMF and cancer. RP 4/26 a.m. at 33. For example, the NAS concluded that “[t]he results of the *in vivo* [“in life”, *i.e.*, in animals] studies do not support an MF [magnetic field] effect on cancer initiation, promotion, or progression, and *they should be recognized as important*

¹⁸ Dr. Israel offered similar testimony about Dr. Carpenter’s failure to account for the many studies on cells which show that EMF does not cause the damage to DNA or chromosomes that is required to cause a normal cell to become a cancer cell. RP 4/26 a.m. at 26-29.

studies in the overall evaluation of potential carcinogenic effects of EMFs.” CP 570 (emphasis added).

By Dr. Carpenter’s own admission, the results of this large body of research do not support his views about EMF and cancer. He therefore decided to ignore it. As Dr. Israel testified, these studies are considered significant by the mainstream cancer research community as well as the broader scientific community, as seen in the reports from the NIEHS, the NAS, and WHO, among others. Dr. Carpenter’s deliberate exclusion of these studies in his evaluation of EMF is not consistent with generally accepted methodology for scientific reviews.

The multiple shortcomings in Dr. Carpenter’s evaluation of the EMF research do not reflect mere “differences of opinion” among competing experts. These are deeply rooted flaws in his scientific method that go to the heart of his opinions. His one-sided approach may be a form of advocacy, but it is not a hallmark of good science. The trial court correctly determined that Dr. Carpenter’s opinions are not based on generally accepted methodology and do not satisfy the admissibility requirements under *Frye*.

2. Dr. Carpenter's Testimony also Was Inadmissible Under ER 702.

Even if Dr. Carpenter's testimony met the *Frye* standard, his testimony is still subject to ER 702. *Copeland*, 130 Wn.2d at 256. As the trial court explained, scientific evidence is "allowed only if it will assist the trier of fact to understand the evidence." CP 1419; *Copeland*, 130 Wn.2d at 256. Although the trial court's Summary Decision focused mainly on *Frye*, the court also found Dr. Carpenter's testimony would not help the trier of fact, as his theories were not supported by science:

Allowing evidence that is unreliable or that is not based on established scientific principles will not be helpful to the fact finder and will only serve to mislead or confuse by inviting a conclusion based on speculative theories or fears that are not supported by science.

CP 1419-20. The trial court compared Dr. Carpenter's methodology to "looking at one piece of a puzzle and drawing a conclusion about the broader picture." CP 1421. Because Dr. Carpenter's unreliable testimony could confuse rather than aid the jury, the court did not abuse its discretion in finding the testimony inadmissible under ER 702, regardless of its *Frye* determination. The trial court's finding is consistent with the findings of other jurisdictions that have evaluated Dr. Carpenter's testimony, like the Pennsylvania PUC, which found that "Dr. Carpenter's opinions were

flawed and were not based on a reliable and objective review of the scientific research.” Appendix A at 112.

3. Homeowners’ Apprehension of Harm from EMF Is Insufficient to Establish a Nuisance Claim.

Homeowners rely on *Bradley v. Am. Smelting & Ref. Co.*, 104 Wn.2d 677, 685, 709 P.2d 782, 787 (1985), as well as *Everett v. Paschall*, 61 Wash. 47, 111 P. 879 (1910), for their proposition that an apprehension of injury is sufficient injury in a nuisance claim. CP 171-74; Br. of Appellants at 30-31. The Court in *Bradley* stated “absent proof of injury, or at least a reasonable suspicion of it, courts are unlikely to invoke their equitable powers to require expensive control efforts.” 104 Wn.2d at 685. The statement is dicta and does not provide a different standard for pleading and proving injury in a nuisance claim. *Bradley* instead reaffirms that in an action for private nuisance, “there is no liability without *significant* harm.” *Id.* at 689 (quoting Restatement (Second) of Torts § 821D, comment *d*, at 102 (1979)) (emphasis added).

Homeowners’ reliance on *Paschall* is similarly misplaced. Although in 1910 the Court in *Paschall* allowed injunctive relief based upon fear of transmission of tuberculosis, the Court’s reasoning is both anachronistic and distinguishable. First, the decision was written well before Washington adopted the *Frye* standard. Second, the reasoning is

inconsistent with Washington's nuisance law, which requires any interference to be both substantial and unreasonable. *Grundy*, 155 Wn.2d at 6. A scientifically unfounded risk cannot rise to the level of an unreasonable and substantial interference. *See, e.g., Cook v. Rockwell Intern. Corp.*, 618 F.3d 1127, 1145-46 (10th Cir. 2010) (applying Colorado nuisance law, which similarly requires any interference with use and enjoyment of property to be unreasonable and substantial). Finally, although the *Paschall* Court remarked in *dicta* that, to establish a nuisance, fear need not be "based in science," its analysis in fact establishes a scientific basis for the alleged fear of tuberculosis because: (1) it was undisputed that tuberculosis would cause injury; and (2) flies could carry the disease to neighboring properties—in stark contrast to Homeowners' unsubstantiated fear of EMF causing cancer and other diseases. *See Paschall*, 61 Wash. at 52-53.

Homeowners cite *Ferry v. City of Seattle*, 116 Wash. 648, 662, 203 P. 40 (1922), as supporting *Paschall*, but *Ferry* actually casts doubt on it. The *Ferry* Court stated that in a nuisance claim for apprehension of danger, the apprehension had to be reasonable. *Id.* Whether an apprehension was reasonable turned on "the realization of the extent of the injury which would *certainly* ensue." *Id.* *Ferry* does not permit a hypothetical injury support a nuisance claim.

This Court should decline to apply *Paschall* in this case, in accord with courts across the country that have rejected nuisance claims where the alleged injury was based on fear of cancer caused by EMF. *See generally* Part I, *supra*; *see also Verb v. Motorola, Inc.*, 672 N.E.2d 1287, 1289, 1296, 284 Ill. App. 3d 460 (Ill. App. Ct. 1996) (dismissing plaintiffs personal injury and damages claims for health risks or increased risk of harm based on EMF emitted by cellular telephones).

4. There Is No Substantial and Unreasonable Interference.

Even assuming Homeowners' alleged injuries were legally cognizable, Homeowners failed to allege any facts demonstrating the presence of EMF on their property is both a substantial and unreasonable interference with their use and enjoyment of the property. *Grundy*, 155 Wn.2d at 6; *San Diego*, 920 P.2d at 696 (citing Restatement (Second) of Torts §§ 821F, 822). Determining whether the invasion is unreasonable requires weighing the gravity of the harm against the social utility of the defendant's conduct. *Highline Sch. Dist. No. 401 v. Port of Seattle*, 87 Wn.2d 6, 17 n.7, 548 P.2d 1085 (1976) (citing W. Prosser, *The Law of Torts* § 87, at 580-81 (4th ed. 1971)); *San Diego Gas & Elec.*, 920 P.2d at 696 (citing Restatement (Second) of Torts §§ 826-831). The court in *San Diego Gas & Electric* found it impossible to conclude that a trier of fact would deem the presence of EMF so serious as to outweigh the social

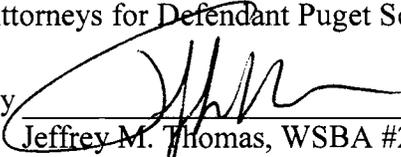
utility of providing electricity to the public. *San Diego Gas & Elec.*, 920 P.2d at 679, 697 (affirming dismissal of the nuisance claim on defendant's demurrer). This Court should do the same.

V. CONCLUSION

Homeowners have failed to demonstrate any error by the trial court. Judge Yu found the expert testimony upon which Homeowners relied inadmissible under *Frye*, precluding Homeowners from demonstrating that fear of EMF was reasonable or that EMF were injurious to Homeowners' health. Additionally, was within its discretion to exclude testimony inadmissible under ER 702. Homeowners had no other cognizable basis for their nuisance claim, as EMF do not substantially and unreasonably interfere with Homeowners' use and enjoyment of their property. Even if this Court were to disagree with Judge Yu's decision on the admissibility of Dr. Carpenter's testimony, RCW 7.48.160 precludes Homeowners' nuisance claim. This Court should affirm the trial court.

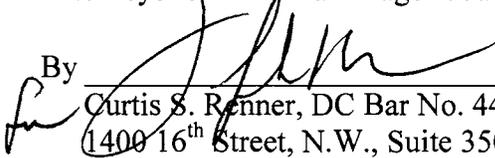
DATED this 27th day of January, 2012.

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DECLARATION OF SERVICE

The undersigned hereby declares under penalty of perjury under the laws of the State of Washington that a copy of the foregoing document was served at the following addresses on January 27, 2012 via the methods indicated:

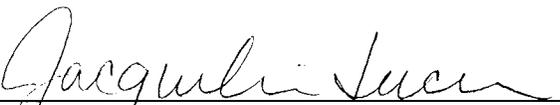
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APPENDIX A

**PENNSYLVANIA
PUBLIC UTILITY COMMISSION
Harrisburg, PA 17105-3265**

Public Meeting held January 14, 2010

Commissioners Present:

James H. Cawley, Chairman, Statement
Tyrone J. Christy, Vice Chairman, Dissenting Statement
Kim Pizzingrilli
Wayne E. Gardner
Robert F. Powelson, Statement

Application of PPL Electric Utilities Corporation
Filed Pursuant to 52 Pa. Code Chapter 57,
Subchapter G, for Approval of the Siting and
Construction of the Pennsylvania Portion of
The Proposed Susquehanna-Roseland 500 kV
Transmission Line in Portions of Lackawanna,
Luzerne, Monroe, Pike and Wayne Counties,
Pennsylvania

A-2009-2082652

Petition of PPL Electric Utilities Corporation
For A Finding That A Building To Shelter
Equipment At The 500-230 kV Substation To
Be Constructed In The Borough of Blakely,
Lackawanna County, Pennsylvania is
Reasonably Necessary For the Convenience
Or Welfare Of the Public

A-2009-2082832

Application of PPL Electric Utilities Corporation Under 15 Pa. C.S. §§1511(c) for a Finding and Determination That The Service To Be Furnished By The Applicant Through Its Proposed Exercise Of The Power Of Eminent Domain To Acquire A Right-Of-Way And Easement Over And Across The Lands Of Chaudari Family Limited Partnership, David Murphy, and Marguerite T. Kranick In South Canaan Township, Wayne County For The Proposed Susquehanna-Roseland 500 kV Transmission Line in Portions of Lackawanna, Luzerne, Monroe, Pike and Wayne Counties, Pennsylvania Is Necessary or Proper For The Service, Accommodation, Convenience Or Safety Of The Public

A-2009-2088297

Application of PPL Electric Utilities Corporation Under 15 Pa. C.S. §§1511(c) for a Finding and Determination That The Service To Be Furnished By The Applicant Through Its Proposed Exercise Of The Power Of Eminent Domain To Acquire A Right-Of-Way And Easement Over And Across The Lands Of The Property Owners Listed Below For The Proposed Susquehanna-Roseland 500 kV Transmission Line in Portions of Lackawanna, Luzerne, Monroe, Pike and Wayne Counties, Pennsylvania Is Necessary or Proper For The Service, Accommodation, Convenience Or Safety Of The Public:

HaRa Corporation

A-2009-2088337

Richard Coccodrilli, Jr.,
Jeffrey J. Coccodrilli,
Ryan T. Coccodrilli, and
Joseph Williams

A-2009-2088327

D&L Realty Company

A-2009-2088340

Rudolph Saporito and
Maria Saporito

A-2009-2088312

David Murphy

A-2009-2088360

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OPINION AND ORDER

BY THE COMMISSION:

I. Introduction

Before the Public Utility Commission (Commission) for consideration and disposition are the Exceptions of PPL Electric Utilities Corporation (PPL or Company), the Office of Consumer Advocate (OCA), the Office of Trial Staff (OTS), the Saw Creek Estates Community Association, Inc. (SCECA) and the Energy Conservation Council of Pennsylvania (ECC) to the Recommended Decision (RD) of Administrative Law Judge (ALJ) Susan D. Colwell. Replies to Exceptions have been filed by PPL, the OCA, SCECA and the ECC.

II. History of the Proceeding

On January 6, 2009, PPL filed its Application for authorization to construct a new 500 kV transmission line approximately 101 miles in length through portions of Lackawanna, Luzerne, Monroe, Pike and Wayne Counties. In conjunction with this Application, PPL is requesting authorization to construct a new substation in Blakely Borough, Lackawanna County, to connect the 500 kV line to the regional transmission system in that area. These filings were consolidated for the purposes of discovery, litigation and decision by Order issued January 12, 2009.

On January 28, 2009, PPL filed thirteen applications for a determination that the proposed exercise of eminent domain over specific properties is necessary or proper for the service, accommodation, convenience or safety of the public. Commission regulations provide that associated eminent domain proceedings are entitled to

evidence to support a determination that the risk of dangers to the health and safety of the Community are reasonable. SCECA Exc at 23.

In its Reply Exceptions, PPL states that the SCECA's exception regarding the safety of the S-R Line structures is without merit. PPL RExc at 20. PPL explains that tubular steel transmission structures are durable and stable because their foundations are designed by geotechnical engineers after extensive soil boring and testing. PPL St. 5-R at 3, 4; PPL RExc at 21. Further, as PPL explained in written testimony, even in the unlikely event of a tubular steel transmission line failure, the conductors would constrain the fall within the right-of-way. PPL St. 5-R at 4, 5; PPL RExc at 21.

Disposition of the Issue

We agree with the ALJ's finding that the overall siting of the entire line has been conducted according to and in compliance with the Commission's regulations and that PPL has provided substantial evidence to support a finding that it plans to use the appropriate safety measures in the construction of its facilities, consistent with NESC requirements and standard industry practice. We find PPL's explanation of the stability of the proposed tubular transmission structures and the safeguards it now takes regarding erosion caused failure, to be persuasive. Accordingly, we shall deny the Exceptions of the SCECA and shall adopt the ALJ's recommendation and rationale used to reach that determination.

5. Electric and/or Magnetic Fields (EMF)

Positions of the Parties

The OCA, the OTS and the ECC did not address this issue.

PPL maintains that there is no reasonable basis to conclude that electric and/or magnetic fields (“EMF”) from the S-R Line will represent a hazard or other interference to members of the public along the right-of-way, including in Saw Creek, PPL MB at 100. There is no reliable scientific basis to conclude that exposure to power frequency EMF from the proposed transmission line will cause or contribute to the development of cancer in children or adults along the proposed route of the line. PPL St. 15-R at 13.

PPL presented the testimony of Mark A. Israel, MD, director of the Norris Cotton Cancer Center at the Dartmouth Medical School, medical doctor, professor and cancer researcher, PPL Statement No. 15-R. Tr. 1166. Dr. Israel’s work focuses on the molecular genetics of cancer, which involve the study of cellular molecules such as genes that have a fundamental role in the development of cancer, PPL St. 15-R at 1, and his curriculum vitae includes work at the National Cancer Institute from 1975 to 1989, where he conducted research on the molecular genetics of childhood cancer, including the discovery of specific genes responsible for the cause of certain cancers in children. PPL St.15-R at 3. He has published over 200 scientific studies on cancer and the molecular genetics of cancer in peer-reviewed scientific journals. PPL St. 15-R at 5; RD at 203.

Dr. Israel focuses on avenues for advancing knowledge of cancer causation and treatment. The many laboratory studies that have been conducted on EMF do not show this to be an area of research that is likely to aid in significantly enhancing the understanding of cancer causation. PPL St. 15-R at 5; RD at 204.

Dr. Israel conducted a review of the studies regarding the effects of EMF on genetic materials in the cell that are known to be required for a normal cell to become a cancer cell. In particular, the studies involved examination of whether cells exposed to EMF show significant, permanent damage to the structure of DNA or chromosomes that could lead to the development of cancer. PPL St. 15-R at 8. As a group, the DNA and

chromosome studies over the past 20 years do not show that EMF have a role in cancer by causing permanent damage to DNA or chromosomes. PPL St. 15-R at 9; RD at 204.

PPL also presented the testimony of Dr. Nancy C. Lee, MD, medical epidemiologist and public health specialist, PPL St. 16-R, Tr. 1174, who from 1999 to her retirement in 2004, was the Director of the Division of Cancer Prevention and Control in the National Center for Chronic Disease Prevention and Health Promotion at the Center for Disease Control, which is the division that develops public health programs and strategies for cancer prevention and control in the U.S. PPL St. 16-R at 2. Dr. Lee has published over 95 articles involving causes of cancer, as well as other epidemiology and public health research and programs in peer-reviewed scientific journals. PPL St. 16-R at 5. She co-authored a book entitled *The Cancer Atlas*, published by the American Cancer Society in 2006 as a comprehensive overview of current knowledge about cancer risk factors, the worldwide burden of cancer, and cancer prevention and control activities by nations around the globe. PPL St. 16-R at 6; RD at 204, 205.

Dr. Lee's evaluation of epidemiology research involving EMF and childhood leukemia, as well as EMF research on areas of adult health, led her to the following conclusion: Based on the lack of consistent statistically significant associations and various methodological concerns, the epidemiology studies relied upon by the SCECA's witness, Dr. Carpenter do not provide a scientific basis to conclude that exposure to magnetic fields is associated with an increased risk of childhood leukemia. PPL St. 16-R at 9; RD at 205.

The NIEHS, which is one of the National Institutes of Health, issued a report on EMF to the U.S. Congress in 1999. The report noted weak associations between EMF and childhood leukemia but no support for those associations from the

laboratory research. The conclusion was that the NIEHS would not rank EMF as an exposure reasonably anticipated to be a cause of cancer. PPL St. 16-R at 10; RD at 205.

The World Health Organization review of EMF research in 2007 concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. PPL St. 16-R at 11; RD at 205.

The 2008 Kheifets meta-analysis concluded that the lack of a clear pattern of EMF exposure and outcome risk does *not* support a hypothesis that these exposures are responsible for the observed excess risk. PPL St. 16-R at 12; RD at 205.

Epidemiological studies do not establish that EMF exposure is a risk factor for neurodegenerative disease. PPL St. 16-R at 13; RD at 205. The epidemiology studies that have examined power frequency EMF and human health, along with the laboratory studies on animals and cellular systems, do not provide a reliable scientific basis to conclude that exposure to EMF would cause or contribute to childhood leukemia, other childhood and adult cancers, neurodegenerative disease, or other chronic health problems. PPL St. 16-R at 14; RD at 205.

The SCECA presented the testimony of David O. Carpenter, M.D. who is employed by the University at Albany, SUNY, as a Professor of Environmental Health Sciences as well as Biomedical Sciences, and a Director, Institute of Health and the Environment. SCECA Sts. 2 and R-2; Tr. 1083; RD at 206. Dr. Carpenter is a public health physician and deals with the health of the population rather than individuals. Tr. 1086; RD at 206. Dr. Carpenter was executive secretary of the New York Power Line Project, but he did not conduct the research. Tr. 1087; RD at 206.

Dr. Carpenter relied upon the Wertheimer Lieber study, which was not a blind study since the investigators already knew which homes had cancer victims. Tr. 1090; RD at 206. In addition, he relied upon “wire codes,” which assume that the thickness of the wire is a reliable indicator of the current flowing through it. Dr Carpenter testified that a wire code is an estimate based upon assumptions. Tr. 1093, 1094; RD at 206, 207.

Several years after the conclusion of the New York Power Lines Project, New York adopted EMF exposure limits for the edge of transmission line right-of way. Dr. Carpenter reported that they were not set on any health standard. Tr. 1102; RD at 207. In addition, Dr. Carpenter served on a committee with the Connecticut Academy of Science and Engineering which published a report in 1992 which concluded that, “after 20 years of active research and several dozens of published papers, there is still no solid evidence for a chain of biological effects that could initiate or promote cancer as a result of exposure to EMF magnetic fields at magnitudes of 500 milligauss or less.” PPL Cross Exam Ex. 6 at 37; Tr. 1105; RD at 207.

The SCECA also presented David W. Fugate, Ph.D., Consulting Engineer for Electric Research & Management, Inc. (ERM), SCECA Statement Nos. 1 and R-1, Tr. 1140, who testified that the two main categories of field effects associated with a high-voltage transmission line are power frequency electric and magnetic fields (EMF) and corona effects. SCECA St. 1 at 2; RD at 210. Based on Dr. Fugate’s testimony, the SCECA avers that the EMF levels at the edge of the existing right-of-way is already too high and that even PPL’s projected rates are not realistic. See SCECA Att. DWF-2; RD at 211.

PPL avers that the amount of EMF at the edge of its right-of-way is akin to everyday exposures to appliances and electric wiring in homes and businesses. To support this comparison, PPL Electric presented the testimony of James Michael Silva,

research engineer specializing in issues related to EMF and president of ENERTECH Consultants, PPL St. No. 14-R and JMS Exhibits 1 and 2; Tr. 1185; RD at 212.

ENERTECH Consultants performs work related to EMF in three areas. First, it conducts applied research projects involving EMF exposure assessment and has worked with researchers at the U.S. National Institute of Environmental Health Sciences, Johns Hopkins University, the University of North Carolina, the California Department of Health Services, and the U.S. National Cancer Institute. Second, it develops and manufactures high quality instrumentation for measurement of EMF and conducts a variety of measurement programs throughout the world. Third, it develops computer software for calculating EMF levels, analyzing measurement data and modeling EMF and electrical environments. ENERTECH designed the EXPOCALC software used for calculating EMF from electric power lines. PPL St. 14-R at 4; RD at 212 Fn. 58.

Finally, the SCECA states that the Saw Creek community residents expressed “significant concern and fears over the proposed S-R Line. Individuals testified that they fear tower failures and construction accidents, and cancer, childhood leukemia and other negative health impacts from the increased magnetic field levels, which will be caused by the proposed S-R Line.” SCECA MB at 27 (transcript citations omitted). The SCECA berates PPL because “PPL’s exhibits and testimony pertaining to PPL’s siting analysis do not mention, analyze, weigh, or otherwise consider the public’s fear and stress over these issues, and claims that this omission means that the Company has failed to satisfy the terms of 52 Pa. Code § 57.76(a)(4).” SCECA RB at 13-14; RD at 217.

ALJ’s Recommendation

The ALJ found that uncontroverted record evidence in this case shows that the existing transmission line was built in 1929, and that the first house in what is now

the Saw Creek Estates was not built until the 1950s. This means that each and every home buyer moved in next to or near the transmission line, which is quite visible and is not hidden from view (see site view photos of Saw Creek Estates), and would appear upon the deeds of those whose property is traversed by the right-of-way. In fact, it crosses the roads in the development in several places. Each of these home buyers has, in effect, agreed to the hazards – real or not – posed by the existing transmission line. Each one has already agreed to the existing levels of EMF and has forfeited any credible claim that the existing level is unacceptable. RD at 208.

The ALJ also found that “*it is only the difference between the existing level and the actual resulting level of EMF which is properly in controversy here.*” According to the ALJ, the SCECA did not present any evidence regarding the effect of this difference. Instead, the SCECA presented Dr. Carpenter’s largely unsubstantiated (albeit heartfelt) opinion that EMF poses a health threat at any level. RD at 208.

The ALJ found, however, that PPL presented convincing testimony that after the upgrade, the higher lines and the use of reverse phasing would actually reduce EMF on the 230 kV side of the right-of-way, and the EMF on the 500 kV side would only rise a small amount. PPL St. 14-R at 16; RD at 210.

The ALJ also found that based upon the evidence presented by PPL’s witnesses Drs. Israel, Lee, and Carpenter, there is no reliable scientific basis to conclude that exposure to power frequency EMF from the proposed S-R Line will cause or contribute to adverse health effects in children or adults along the proposed route of the line. RD at 210. The ALJ continued by noting that in its Main Brief, the SCECA repeats portions of Dr. Carpenter’s pre-filed testimony, but does not address any of the serious shortcomings in his opinions that were identified by the other experts and through cross-examination. The record evidence shows that Dr. Carpenter’s opinions were flawed and were not based on a reliable and objective review of the scientific research. By contrast,

the detailed evaluations of the research and the well-supported conclusions reached by Dr. Israel and Dr. Lee were not challenged on cross-examination. Their conclusions were also consistent with the findings of reputable public health agencies and were supported by Dr. Fugate's testimony on behalf of Saw Creek. In light of this overwhelming evidence, there is no good basis to give any weight to Dr. Carpenter's extreme views. RD at 210, Fn. 57.

The ALJ noted that there are no federal exposure limits, and there are no state exposure limits in Pennsylvania. Only two states have adopted magnetic field exposure limits for transmission lines: New York has a limit of 200 mG at the edge of the transmission line right-of-way, and Florida has a limit of 150-250 mG depending on the size of the transmission line. The International Commission on Non-Ionizing Radiation (ICNIRP) recommended in 1998 that the 60 Hz magnetic field exposures should not exceed 833 mG, and the IEEE recommended in 2003 that public exposures to 60 Hz magnetic fields should not exceed 9,000 mG. PPL St. 14-R at 18; RD at 213.

While the depth of genuine fear that was expressed by the residents of the Saw Creek Estates is not in question, this argument has no merit. The SCECA is relying upon a tortured reading of the Commission's regulation in using it to require a company to address stress and fear instead of the underlying reasons for those fears. The regulation is clearly meant to require a critical and objective review of the impact of a proposed line on the land itself. RD at 218.

The ALJ stated that although PPL has not addressed the actual *fears* of the public, it has addressed the underlying reasons for each and every one of those concerns. See, e.g., PPL Electric St. 5-R (rebuttal testimony of Jay A. Keeler, Supervising Engineer in Transmission and Distribution Design, and Electric and Magnetic Fields Issues and Manager for PPL); PPL E Sts. 3-R, 5-R, 20, 21, 15-R, 16-R, and 19-R; RD at 218.

In conclusion, the ALJ found that the SCECA has not presented sufficient evidence to counter the Company's presentation regarding the effects of this proposed transmission line. RD at 218.

Exceptions to the ALJ's Recommendation

In the SCECA's second Exception it stated that the ALJ erred by improperly rejecting evidence of the risks of diseases caused by magnetic fields. SCECA Exc at 7. The SCECA contends that the ALJ accepted the erroneous contention that the results of epidemiological studies on childhood leukemia are "inconsistent." RD FF 251-257. The SCECA states that while these results are not unanimous, they are consistent. SCECA Exc at 8.

In Reply, PPL states that the SCECA's attack on the sufficiency of the ALJ's Decision related to electronic and/or magnetic fields is without merit. PPL states that the SCECA does not identify any EMF evidence that was not duly considered by the ALJ. PPL RExc at 22. PPL also states that the ALJ considered all of the scientific evidence, and based upon a careful evaluation of that evidence and the credibility of the expert witnesses, reached a well-founded conclusion that the scientific research does not provide a reliable basis to find that exposure to EMF causes or contributes to adverse health effects in adults or children. PPL RExc at 22.

Disposition of the Issue

We agree with the ALJ regarding the testimony of the SCECA witness Dr. Carpenter. When the record is viewed in its entirety it is clear that Dr. Carpenter's testimony is his largely unsubstantiated (albeit heartfelt) opinion that EMF poses a health threat at any level. We find the evidence presented by PPL to be persuasive on this issue

and shall adopt the finding of the ALJ that *inter alia* PPL has addressed the underlying reasons for the fears expressed by the residents of the Saw Creek Community. Accordingly, the Exceptions of SCECA are denied.

6. Real Estate Values

Positions of the Parties

The SCECA presented testimony to indicate that PPL's proposed S-R Line project would have a negative effect on the real estate values in the Saw Creek Estates. The SCECA asserts that the proposed towers will significantly detract from the quality of the views in the Saw Creek Community.

The proposed towers will constitute a significant change to the existing landscape and viewshed. "The existing towers, at an average height of 83 feet, are from many points within Saw Creek completely hidden by the existing tree line. ... the [proposed] towers/lines will be at least twice as tall as the highest surrounding trees, and those towers and lines will become visible from locations which now have no view of the existing towers and lines. The visual effect will be like an elevated rail fence (or, alternatively, a music staff), running north/south across the easterly slope of the Saw Creek valley, with highly-visible conductors between towers, unlike the present lines, where conductors are barely visible from a distance. SCECA St. 3 at 12, 13; RD at 243.

To evaluate the real estate conditions regarding values with respect to Saw Creek, 15 people were interviewed concerning recent sales or attempted sales – 14 buyers and 1 seller. Tr.1928; RD at 243. Two buyers were not sure whether knowledge of the proposed line would have affected their decision to buy the property, two buyers said it

Disposition of the Issue

We have discussed and resolved each of these Exceptions in the appropriate sections of this Opinion and Order and do not find it necessary to reiterate our discussions here. Accordingly, we shall deny the Exceptions of the OTS, the OCA and the ECC on these issues.

J. CONCLUSION

For the reasons discussed above, we will grant, in part, and deny, in part, the Exceptions of the Parties in this proceeding. We will adopt the Recommended Decision of Administrative Law Judge Susan D. Colwell as modified by and consistent with the foregoing Opinion and Order and grant the Applications of PPL Electric Utilities Corporation, consistent with this Opinion and Order; **THEREFORE,**

IT IS ORDERED:

1. That the Recommended Decision of Administrative Law Judge Susan D. Colwell is adopted as modified by this Opinion and Order.
2. That the Exceptions filed by PPL Electric Utilities Corporation, the Office of Consumer Advocate, the Saw Creek Estates Community Association, Inc. and the Office of Trial Staff, are denied, in part, and granted, in part, consistent with this Opinion and Order.

3. That the Application of PPL Electric Utilities Corporation Filed Pursuant to 52 Pa. Code Chapter 57, Subchapter G, for Approval of the Siting and Construction of the Pennsylvania Portion of the Proposed Susquehanna-Roseland 500 kV Transmission Line in Portions of Lackawanna, Luzerne, Monroe, Pike and Wayne Counties, Pennsylvania, as amended, filed at Docket No. A-2009-2082652, is granted, subject to the conditions set forth in this Opinion and Order.

4. That the Application of PPL Electric Utilities Corporation for the finding that the exercise of the power of eminent domain to acquire right-of-way across five tracts of land is necessary or proper for the service, accommodation, convenience or safety of the public is granted for the following applications:

- (a) The property owned by HaRa Corporation in Middle Smithville Township, Monroe County, Docket No. A-2009-2088337;
- (b) The property owned by Richard Coccodrilli, Jr., Jeffrey J. Coccodrilli, Ryan T. Coccodrilli, and Joseph Williams in South Canaan Township, Wayne County, Docket No. A-2009-2088327;
- (c) The property owned by D&L Realty Company in Archbald Borough, Lackawanna County, Docket No. A-2009-2088340;
- (d) The property owned by Ralph Saporito and Maria Saporito in South Canaan Township, Wayne County, Docket No. A-2009-2088312; and
- (e) The property owned by David Murphy in South Canaan Township, Wayne County, Docket No. A-2009-2088360.

5. That the Petition of PPL Electric Utilities Corporation for a Finding That a Building to Shelter Equipment At the 500-230kV Substation To Be Constructed in the Borough of Blakely, Lackawanna County, Pennsylvania is Reasonably Necessary for the Convenience or Welfare of the Public, filed at Docket No. A-2009-2082832, is granted.

6. That the protests filed against one or more of these consolidated Applications are granted insofar as they result in the conditions imposed in this Order upon PPL Electric Utilities in the construction of this project and denied insofar as they oppose the grant of authority to construct the Susquehanna Roseland 500 kV Transmission Line as described herein.

7. That the conditions for this project are as follows:

A. That PPL Electric Utilities Corporation replace or repair any damage to homes, residences, other buildings or property caused by the construction of this project.

B. That PPL Electric Utilities Corporation comply with any and all restrictions on the permits received from any agency or entity from which a permit is required in order to construct this project.

C. That where possible, archeological resources identified in the transmission line corridor, in the direct path of access roads or at locations of proposed work areas will be avoided by relocation of structures, rerouting of access roads and reconfiguring and relocating of work areas consistent with agreements between PPL Electric Utilities Corporation and the Pennsylvania Historic and Museum Commission and the Bureau of Historic Preservation protocols.

D. That PPL Electric Utilities Corporation will follow protocols for cultural resource studies for the proposed Susquehanna-Roseland 500 kV Transmission Line project that have been agreed upon with the Pennsylvania Historic and Museum Commission and the Bureau of Historic Preservation. Any identified archeological sites that may be adversely affected will require an evaluation of eligibility for inclusion in the NRHP. Any curation of artifacts would be coordinated with the State Historic Preservation Office.

E. That PPL Electric Utilities Corporation will provide adequate advance notice to the Saw Creek Estates Community Association and each Saw Creek resident whose property is burdened by the transmission line right-of-way of when construction will be performed within the Saw Creek Estates, including when a helicopter may be used. A copy of the notice will be served upon the Commission's Bureau of Conservation Economic and Energy Planning.

F. That PPL Electric Utilities Corporation will develop a plan to educate communities located along the proposed route regarding the construction, the mitigation efforts to be used to ensure the safety of the citizens and property, and to provide basic information regarding line features, which shall be served upon the Office of Consumer Advocate, Office of Trial Staff, Energy Conservation Council and Saw Creek Estates Community Association as well as the Commission's Bureau of Conservation Economic and Energy Planning and Office of Communications within sixty days of the final Order in this matter.

G. That PPL Electric Utilities Corporation shall within 30 days of the release of PJM's next update to the 2008 RTEP, or a new baseline RTEP report, file a report with this Commission at this docket regarding PJM's latest findings regarding the forecasted reliability contingencies this project is intended to address. PPL Electric Utilities Corporation shall identify whether it intends to defer its construction schedule, and if necessary, identify any needed revisions to the relief granted by the Commission in this proceeding.

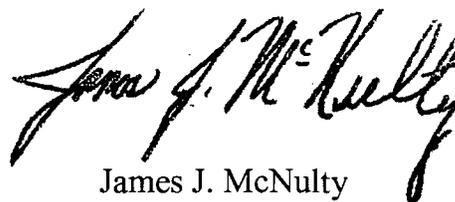
8. That the request of PPL Electric Utilities Corporation to replace the 230 kV line from Wallenpaupack to Bushkill in kind is granted but construction shall not commence until PPL Electric Utilities Corporation has obtained the National Park Service permit for the portion of the line through the Delaware Water Gap Recreation Area.

9. That the approvals granted in this Order shall expire unless construction of the Susquehanna-Roseland 500 kV Transmission Line project commences within three years of the entry date of this Opinion and Order.

10. That any directive, requirement, disposition or the like contained in the body of this Opinion and Order that is not the subject of an individual Ordering Paragraph shall have the full force and effect as if fully contained in this part.

11. That the Secretary of the Commission mark the consolidated proceedings at Docket Nos. A-2009-2082652; A-2009-2082832; A-2009-2088297; A-2009-2088337; A-2009-2088327; A-2009-2088340; A-2009-2088359; A-2009-2088312 and A-2009-2088360, as closed.

BY THE COMMISSION,

A handwritten signature in black ink, appearing to read "James J. McNulty". The signature is written in a cursive, flowing style.

James J. McNulty
Secretary

(SEAL)

ORDER ADOPTED: January 14, 2010

ORDER ENTERED: February 12, 2010