The Power Line Plaintiff & the Inverse Condemnation Alternative

Todd D. Brown

Follow this and additional works at: http://lawdigitalcommons.bc.edu/ealr

Part of the Energy and Utilities Law Commons, and the Environmental Law Commons

Recommended Citation


This Comments is brought to you for free and open access by the Law Journals at Digital Commons @ Boston College Law School. It has been accepted for inclusion in Boston College Environmental Affairs Law Review by an authorized editor of Digital Commons @ Boston College Law School. For more information, please contact nick.szydlowski@bc.edu.
Imagine you have been living at the end of a small street for over forty years. Just past the property line of your backyard are an electrical substation and a number of power lines that run parallel to the street. In recent years you have noticed that, during certain times of the day, it is virtually impossible to spend any time in your backyard without experiencing the sensation of static electricity on your skin or even occasional shocks. In the morning newspaper an article reports that a resident living on your street just died of cancer. The article also mentions that the victim’s daughter recently was diagnosed with a malignant brain tumor. This news comes just a week after you learned about another neighbor whose husband and fourteen-year-old daughter died from similar types of cancer. In fact, after further research, you discover that in the past forty years, seven of the eight houses on your street have had residents with cancer, while five of the houses have had two or more cancer-related deaths. Some claim this is mere coincidence. Nonetheless, would you consider remaining in such a neighborhood, where the only common link among all of these cancer victims is their proximity to the same high-voltage power lines that cross by your back yard? If you are like most of us, your answer is probably no.¹

¹ This hypothetical is based on actual events occurring throughout the country. For example, Irene Pardun has lived in the same house in Milltown, New Jersey, for over 42 years. See Cancer Cluster EMFs: A True Link or an Epidemiologist's Nightmare?, MICROWAVE NEWS, Sept.–Oct. 1990, at 8. In 1982, she was diagnosed with a nonmalignant brain tumor, which has been surgically removed. Id. Pardun also has suffered from recurring cysts. Id. Her daughter was diagnosed with the muscular disease myasthenia gravis when the child was
Scenarios like this one are occurring with increased frequency throughout the country. As a result, high-voltage power lines are presently the focus of much public attention. Although there have been fears about high-voltage power lines for years, the last decade has witnessed a tremendous increase in public concern. This upsurge is due not only to the growing number of medical and scientific studies, but also because of close scrutiny and speculation by the media.

12 years old. Id. Two houses down from Pardun, a 14-year-old girl died of a brain tumor in 1961; in 1989, the girl's mother was diagnosed with a brain tumor. Id. Two houses down from Pardun in the opposite direction, a man died of cancer in the mid-1980s; his daughter, who currently is living next door to Pardun, also recently was diagnosed with cancer. Id. Directly across the street from Pardun, there is a four-family house in which two inhabitants have died of cancer. Id.

Five girls living near a 69-kilovolt (kV) power line in Jacksonville, Florida, developed rare types of ovarian cancer between 1974 and 1978. Cancer Cluster EMFs: A True Link or an Epidemiologist's Nightmare?, MICROWAVE NEWS, Sept.–Oct. 1990, at 8. Between 1981 and 1989, four students attending an elementary school in Montecito, California, that was located next to a 66-kV power line were diagnosed with leukemia lymphoma. Id. In Guilford, Connecticut, a residential map of a small street located next to a high-voltage substation and power lines showed clustering of cancers along the route of the power lines. Id. at 9. While there are only ten houses on this street, four have residents with brain tumors. Id. Vancouver, Washington, has reported seven cases of cancer among students who attended an elementary school between 1982 and 1989. Id. This school was located next to a 12.5-kV distribution line and a 115-kV transmission line. Id. In Darrington, Washington, there have been at least twelve cases of cancer among nineteen homes located next to two 230-kV transmission lines. Id.


Public concern over power lines focuses on the potential health effects that electromagnetic fields (EMFs) have on people who are exposed to them on a regular basis. Although there have been significant laboratory and epidemiological studies on the effects of EMFs, no conclusive evidence yet exists that exposure to these fields poses serious health risks. For this reason, plaintiffs who are exposed to high-level power line EMFs may be unable to recover under traditional tort remedies, because scientists have not yet proven a causal link between EMF exposure and serious health effects. In the meantime, while the science world debates the effects of EMFs, market values of property located near power lines continue to plummet.

In recent condemnation proceedings, many courts have recognized that the fears associated with power lines diminish property values, and have taken these fears into account in determining compensation for condemnees. Although the value of "power line plaintiffs" property is continuously decreasing, they do not have the luxury of seeking compensation through a present day condemnation proceeding. Instead, to recover lost value, power line plaintiffs must show that a power company actually has taken their property—that a taking for which the Constitution requires compensation has occurred.

The United States Supreme Court has recognized that a taking of property is not limited to an actual physical appropriation. In fact, the Court has held that certain statutory regulations, physical invasions, and even nuisances may constitute takings of private prop-

---

6 While biological effects are the main issue of today, early public concerns focused on the aesthetic impact of large high-voltage towers, the ecological impacts of their right of ways (ROWs), and the nuisance effects of their EMFs, such as television and radio interference and electric shocks from power lines. See United States Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric and Magnetic Fields—Background Paper OTA-BP-E-53 (Washington D.C., U.S. Gov't Printing Office, May 1989). [hereinafter Biological Effects].

7 See infra text accompanying notes 43–78.

8 See infra text accompanying notes 79–94. Nonetheless, there have been many personal injury suits by plaintiffs claiming exposure to harmful radio waves and other electromagnetic waves. For examples, see Microwave News, Sept.–Oct. 1990, at 8; Microwave News, Sept.–Oct. 1989, at 1.


10 For the purpose of this Comment, a "power line plaintiff" is a property owner who has lived near electrical substations or high-voltage power lines and been exposed to their EMFs for a number of years.

11 See infra text accompanying notes 222–272.
Many state courts have adopted this same reasoning. Some states have added clauses to their constitutions that allow property owners to be paid just compensation when the government takes or damages their property.

Property owners who fail to institute condemnation proceedings still may acquire just compensation for a taking of their property by filing an "inverse condemnation" suit. Power line plaintiffs who file inverse condemnation suits must demonstrate that their exposure to EMFs constitutes a taking of private property for which compensation is due. The Supreme Court's cases on airspace easements and taking by nuisance will provide power line plaintiffs with helpful analogies. Proving that EMFs are an actual invasion of airspace or that fear of EMFs is a sufficiently substantial interference with the use and enjoyment of land to constitute a taking will be a power line plaintiff's biggest challenge. Nonetheless, it is a challenge that the potential plaintiff should take, for regardless of whether science ever proves that EMFs cause cancer, many property owners are suffering from decreased property values. Although power companies provide citizens with a valuable public benefit, there are many for whom the financial burden of living near power lines significantly outweighs the benefits. For these plaintiffs, a judicial remedy is appropriate.

Section II of this Comment presents the scientific and medical background necessary for a meaningful discussion of electric and magnetic fields. While all available evidence is still inconclusive, there have been studies of EMF exposure that demonstrate biological effects at the cellular level. Section III discusses the potential personal injury claims against power companies. Because of the difficulty of proving causation, personal injury suits are, for the moment, infrequent and virtually unwinnable. Section IV surveys

13 See JULIUS SACKMAN, NICHOLS' THE LAW OF EMINENT DOMAIN § 6.01[1], at 6-10, n.22 (1992 Supp.).
14 See, e.g., WASH. CONST. art. 1, § 16.
15 See SACKMAN, supra note 13, § 6.21, at 6-136.
16 See infra text accompanying notes 222-272.
18 See Freeman, supra note 9, at 20.
19 See infra text accompanying notes 27-78.
20 Id.
21 See infra text accompanying notes 79-94.
22 See infra text accompanying notes 79-94.
the present state of the law regarding whether the fear associated with power line exposure may be compensable for a private land owner whose property a power company condemns. 23 Section V briefly discusses the Supreme Court’s takings cases and then presents a history of airspace easement cases and taking by nuisance cases. 24 Section VI recommends that landowners whose property values are dropping because of their proximity to power lines should use the analyses and reasoning of these cases to file inverse condemnation suits. 25 Finally, Section VII concludes that the power line controversy is a serious public concern that the courts alone cannot solve. 26 If scientists ever are going to determine conclusively the health effects of EMFs, there needs to be a unified and extensive federal research program that is adequately funded.

II. SCIENTIFIC AND MEDICAL ASPECTS OF ELECTROMAGNETIC FIELDS

A. What are Electromagnetic Fields?

Electric and magnetic fields exist wherever there is electric power. 27 As a result, people are exposed to electric and magnetic fields every day, whether from power lines, appliances, wiring, or lighting, at home or in the work place. 28 Power-generating stations create these fields by pumping electrical charges into the power system. 29 An electric field 30 arises from the amount of such a charge,
while a magnetic field\textsuperscript{31} arises from the motion of that charge.\textsuperscript{32} The strength of a power line’s electric field depends on its voltage: \textsuperscript{33} the higher the voltage, the stronger the electric field. A magnetic field, on the other hand, is the product of currents of electricity. \textsuperscript{35} Thus, the intensity of a power line’s magnetic field depends on the strength of its current.\textsuperscript{36}

The interaction of electric and magnetic fields produces EMFs.\textsuperscript{37} In essence, EMFs are forms of electric and magnetic energy moving together through space.\textsuperscript{38} The fields associated with power lines are at the low end of the energy spectrum\textsuperscript{39} and thus are referred to as

\textsuperscript{31} A magnetic field is the force that a moving charge exerts on another moving charge because those charges are in motion. ELECTRIC AND MAGNETIC FIELDS, supra note 27, at 2. Groups of charges all moving in the same direction produce an electric current, and these currents produce magnetic fields. Id. The most common unit in measuring magnetic fields is the “gauss” (G). BIOLOGICAL EFFECTS, supra note 6, at 8. Sixty-hertz magnetic fields usually are described in thousands of gauss or “milligauss” (mG). Id. The intensity of these magnetic fields declines rapidly with distance. Id. at 8. Housing, trees, and other large objects do not block magnetic fields. Id. at 16. Only materials containing large amounts of ferrous or other special metals will block magnetic fields to any appreciable degree. Id.

\textsuperscript{32} See BIOLOGICAL EFFECTS, supra note 6, at 1.

\textsuperscript{33} See ELECTRIC AND MAGNETIC FIELDS, supra note 27, at 5. Transmission lines can carry voltages of up to 765 kV. See BIOLOGICAL EFFECTS, supra note 6, at 4.

\textsuperscript{34} See ELECTRIC AND MAGNETIC FIELDS, supra note 27, at 5.

\textsuperscript{35} Id.

\textsuperscript{36} Id. For example, a plugged-in hair dryer produces an electric field regardless of whether or not it is turned on. Id. It is the voltage of the hair dryer that determines its electric field, not the flow of current. Id. As soon as the hair dryer is turned on, it starts producing a magnetic field. Id. Switching the hair dryer to a higher heat setting causes it to draw more current and produce a stronger magnetic field. Id. In the United States, electric power involves charges that move in currents with a frequency of 60 cycles per second, or 60 Hertz (Hz). Id. at 1. Because 60-Hz power is so widely used, there are 60-Hz EMFs almost everywhere. See id.

\textsuperscript{37} See ELECTRIC AND MAGNETIC FIELDS, supra note 27, at 1.

\textsuperscript{38} See DeBoskey, supra note 3, at 32. The electromagnetic spectrum measures this energy according to a scale based on frequency—cycles per second or Hz—and wavelength. John Weiss, Note, The Power Line Controversy: Legal Responses to Potential Electromagnetic Field Health Hazards, 15 COLUM. J. ENVTL. L. 359, 362 (1990).

\textsuperscript{39} Id. Electromagnetic energy is the product of the frequency and wavelength of an electromagnetic wave. See Pamela J. Laquidara, Comment, Litigating Nonionizing Radiation Injury Claims: Traditional Approaches to a Contemporary Problem, 10 B.C. ENVTL. AFF. L. REV. 965, 967 (1983). The emission of electromagnetic energy sometimes is referred to as radiation. See id. The radiation that most people associate with the risk of cancer is that emitted in the form of gamma rays or x-rays. ELECTRIC AND MAGNETIC FIELDS, supra note 27, at 9. Radiation of this type is termed “ionizing” because it contains enough energy to break molecular bonds, possibly splitting apart DNA molecules that make genes. Id. The splitting of DNA molecules may be the means by which x-ray exposure can lead to cancer. Id. Microwaves carry less energy than x-rays and thus cannot break molecular bonds. Id. Nonetheless, microwaves can cause serious health damage because they are absorbed by the water in body tissue, where they set up strong currents. Id. The result is extreme heating of the body tissue. Id.

Power lines, however, emit nonionizing electromagnetic radiation. Id. Although 60-Hz fields
fields of “extremely low frequency,” or ELF fields. These fields can produce currents within the human body and electric charges on the surface of the body through a process known as electric and magnetic induction. While it is possible to measure these fields, scientists still do not know the relationship between exposure level and effects on human health.

**B. Do Electromagnetic Fields Pose Health Risks?**

Until the mid-1970s, few scientists believed that humans were at risk of suffering any harmful effects as a result of exposure to EMFs during their everyday use of electricity. This was largely due to the fact that these fields cannot transfer enough energy to disrupt cellular bonds. During the past fifteen years, however, various studies have demonstrated that low-energy EMFs can affect biological systems. While health effects research in this area is still

---

40 See Weiss, supra note 38, at 362. As previously noted, the frequency of electric power in the United States is 60-Hz, and its corresponding wavelength falls somewhere in the \(10^6\) range (in meters), thus placing it at the low end of the electromagnetic spectrum. See Laquidara, supra note 39, at 968 n.21. At the high end of the spectrum are x-rays and gamma rays, with frequencies in the \(10^{20}\) range (Hz) and wavelengths of \(10^{-10}\) (meters) and smaller. See id. Examples of electromagnetic waves include, in ascending order based on frequency, electric power, radio waves, microwaves, infrared waves, visible light, ultraviolet waves, x-rays, and gamma rays. See id. This Comment uses the term “ELF” to specify the extremely low frequency EMFs that power lines emit.

41 BIOLOGICAL EFFECTS, supra note 6, at 16. The human body contains free electric charges. Id. These charges move in response to the charges emitted and the currents flowing from nearby power lines and appliances. Id.

42 BIOLOGICAL EFFECTS, supra note 6, at 19. The OTA report stated that “[s]cientists do not know whether we should be concerned with the strength of the field, the change in field strength over time, the currents induced in the body, or some other variable.” Id. For this reason, electromagnetic radiation is different from most environmental hazards. Id. Usually when experts determine that a chemical or other environmental agent is harmful, one safely can assume that greater exposure to that agent causes greater risks of adverse health effects. Id. Much of the scientific evidence about power-frequency fields, however, suggests that the “more is worse” assumption does not apply. Id.

43 BIOLOGICAL EFFECTS, supra note 6, at 1.

44 Id.

45 Id. at 2. While the evidence is still inconclusive, recent studies suggest that members of the scientific community have changed their views. As recently as a few years ago, most scientists were claiming that there are no human health risks involved with exposure to power-frequency fields. Id. at 3. According to the OTA report, “the emerging evidence no
preliminary and inconclusive, many scientists are starting to recog-
nize the validity and the potential dangers of such findings. 46

Scientists have conducted three types of studies on the effects of
ELF field exposure. 47 Studies of the first type are laboratory exper-
iments performed at the cellular level. 48 In these experiments, sci-
entists observe animal or human tissues or cell cultures that they
have exposed to ELF fields. 49 Many of these experiments have dem-
onstrated that, under certain circumstances, ELF fields can alter
 cellular processes. 50 While there is no evidence that ELF fields
initiate cancer in the same way that x-rays and gamma rays do,
many scientists believe that these fields may act as cancer "promot-
ers". 51 Nonetheless, cellular research does not prove that humans
exposed to ELF fields will suffer harmful health effects. 52 Because
there are so many variables involved with the cellular experiments,
the relationship between ELF exposure and adverse health effects
remains inconclusive. 53

A second type of research that has been performed is "whole
animal" studies. In these experiments, scientists observe live ani-
mal s and humans exposed to ELF fields. 54 To date, there is some
evidence that exposure to ELF fields may have minimal effects on
the development of living animals and their reproductive and central
nervous systems. 55 Unlike the cellular experiments, however, whole

longer allows one to categorically assert that there are no risks." Id. The OTA report also
stated, however, that this does not necessarily mean there is a significant risk. Id.

46 Id. at 24. For a comprehensive summary of these studies, see Sherry Young, Regulatory
and Judicial Responses to the Possibility of Biological Hazards from Electromagnetic Fields

47 BIOLOGICAL EFFECTS, supra note 6, at 24.

48 Id.

49 Id. at 33; see also Young, supra note 47, at 137.

50 BIOLOGICAL EFFECTS, supra note 6, at 24-28; see also Young, supra note 47, at 137-38.

51 When a cell's growth ability is affected, the likelihood of cancer promotion may be
increased. See Young, supra note 47, at 138 n.33. For example, experiments have found
abnormal levels of calcium production from cell membranes in brain tissue that was exposed
to ELF fields. Id. Another study found that exposed cancer cells proliferated more rapidly
than unexposed cancer cells. BIOLOGICAL EFFECTS, supra note 6, at 32-33. Attempts to
replicate these findings, however, have been unsuccessful. Id.

52 See Young, supra note 47, at 139.

53 It is important to keep in mind that in vitro [cellular] experiments are conducted
under artificial conditions, with the cell isolated from all the interrelated systems
that make up the whole organism. Results observed under these conditions may not
be duplicated under comparable exposure of the whole organism, and the effect on
humans, if any, will be even less predictable.

54 Id.; see also BIOLOGICAL EFFECTS, supra note 6, at 24-33, 67-68.

55 BIOLOGICAL EFFECTS, supra note 6, at 24.

56 Id.
animal studies demonstrated that ELF field exposure has no effect on blood or the immune system. Perhaps most important, these studies have found no connection between ELF field exposure and any impacts on human physiology. Consequently, as with the cellular experiments, many of the findings from whole animal studies are inconclusive on the issue of whether ELF fields have adverse effects on human health.

The last type of research regarding ELF fields involves epidemiological studies of human populations exposed to these fields at work or in their homes. Although cellular and animal studies have demonstrated possible health effects from ELF exposure, it has been these epidemiological studies that have created the most public concern. Epidemiological studies on the effects of ELF fields have attempted to identify a significant relationship between a population’s exposure to power-frequency fields—cause—and its “increase incidence” of cancer—effect. It is important to note, however, that a finding of a statistically significant relationship does not establish proof of causation. In fact, many scientists believe that the existing epidemiological studies on ELF exposure are contradictory and lack statistical significance. Because the media frequently misrepresents epidemiological studies by claiming them to demonstrate new scientific “proof” of adverse health effects, too much meaning frequently is attached to the results of these studies, particularly by nonscientists. On the other hand, while this type of media attention is misleading, the epidemiological studies on ELF exposure nonetheless have shown enough evidence to justify more research.

In the United States, the first epidemiological study dealing with ELF fields was the 1979 Wertheimer-Leeper study. This research
was compelling because it revealed that children living near high-current electrical wires died of leukemia at a rate of 1.6 to 2.2 times greater than children living near low-current wires. The Savitz study, a 1988 study essentially replicating the Wertheimer-Leeper study, calculated the risk ratio at 1.5, slightly lower than the previous study. Most scientists give greater weight to the Savitz study because of its thoroughness. In addition, three other groups of researchers have studied the possible correlations between EMFs and childhood cancer. Two studies found no association between estimated exposure to magnetic fields and leukemia, while one other found a higher risk for various cancers.

Scientists also have conducted epidemiological studies in adult residential and occupational environments. Residential exposure studies have many variables, such as uncertainties in the amount of field exposure levels, and consequently do not provide reliable evidence to suggest a relationship between EMF exposure and cancer. Although adult occupational exposure studies have been more extensive, the results are similar, indicating either a small positive association between ELF fields and cancer or none at all.

A link between ELF field exposure and human health effects thus remains unclear. Laboratory research has shown that EMFs can interact with and produce some changes in biological systems. The two most significant findings are the effects on the central nervous systems of animals and the possibility of cancer promotion in animals. While the results of this research are consistent with the workers on a transmission line started suffering from various forms of cancer and leukemia. Biological Effects, supra note 6, at 1; see also Young, supra note 47, at 148.

See Wertheimer & Leeper, supra note 65, at 273–84; N. Wertheimer & E. Leeper, Adult Cancer Related to Electrical Wires Near the Home, 11 Int'l J. Epidemiology 345 (1982). For a general discussion of the significance of these figures, see Biological Effects, supra note 6, at 58.

See Robert Pool, Is There an EMF-Cancer Connection?, 249 SCIENCE 1096, 1097 (1990). The Savitz study was purposefully similar to the Wertheimer-Leeper study but tried to correct the weaknesses of the earlier study. “For example Savitz performed statistical analysis to make sure his results were not skewed by such possible confounding factors as socioeconomic class or mothers smoking during pregnancy.” Id.

See Biological Effects, supra note 6, at 58–59.

Id.

Id. at 62–63.

Id. at 62.

Id.

Id. at 67.

Id. at 67–68.
proposition that ELF fields may play a role in cancer or tumor development, none of these findings constitutes conclusive proof.76 Epidemiological studies are similarly inconclusive and contradictory. Thus, the strongest claim which one can make at this point is that the known biological effects of ELF fields make it possible that these fields promote cancer.77 Whether possibility will become probability depends on the results of additional research.78

III. THE PERSONAL INJURY DILEMMA

Although the number of personal injury suits relating to EMF exposure is on the rise, there are many barriers preventing a flood of tort litigation in the near future. As in most litigation, the expense of bringing an EMF personal injury suit can be enormous, particularly considering the funds a power line plaintiff would need in order to offer expert testimony.79 In contrast, power companies usually have more than enough financial resources to wage a long, drawn-out defense campaign. In addition, many jurisdictions have statutes of limitations that may preclude potential plaintiffs from bringing an action.80 Effects of EMF exposure, even if proven harmful, may not show up until after a state’s statute of limitations has run.

The most troubling hurdle for potential personal injury plaintiffs, however, is proving causation.81 A plaintiff who is pursuing a cause

76 Id. at 68.
78 Id. After a two-year review of EMF health effects, the United States Environmental Protection Agency (EPA) originally reached the following conclusion:
Concerning exposure to fields associated with 60-Hz electrical power distribution, the conclusion reached in this document is that such exposure is a ‘probable’ carcinogen risk factor, corresponding to a ‘B1’ degree of evidence that it is a risk factor. This conclusion is based on ‘limited’ evidence of carcinogenicity [in] humans which is supported by laboratory research indicating that the carcinogenic response observed in humans has a biological basis, although the precise mechanisms [are] only vaguely understood.
EPA’s Original Conclusion: 60Hz EMFs are ‘B1’ Carcinogens, MICROWAVE NEWS, May–June 1990, at 1. By designating ELF EMFs as “B1” carcinogens, the EPA placed them in a general class with polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethanes (DDTs), and formaldehyde. See id. at 9. The agency deleted this conclusion prior to issuing its final EPA report. Id. at 1. Some journalists feel that there was pressure from the White House to alter the report because it is all part of a conspiracy or cover-up by the utility industry. See, e.g., P. Brodeur, CURRENTS OF DEATH: POWER LINES, COMPUTER TERMINALS, AND THE ATTEMPT TO COVER UP THEIR THREAT TO YOUR HEALTH (1989).
79 See Weiss, supra note 38, at 363–64.
80 Id.
81 W. PAGE KEETON ET. AL., PROSSER AND KEETON ON THE LAW OF TORTS § 41, at 269 (5th ed. 1984); Laquidara, supra note 39, at 981–82.
of action in tort has the burden of proving that the defendant caused the plaintiff's alleged injury. In a power line EMF exposure case, a plaintiff would have to overcome the initial hurdle of proving that the ELF fields produced by the defendant's power lines actually caused the alleged injury. A mere possibility of such causation is not enough, and if the matter remains one of speculation, then the court must issue a directed verdict in the defendant's favor. As noted above, the scientific and medical evidence regarding the effects of EMF exposure on humans is inconclusive. Thus, to satisfy the causation requirement in a tort cause of action, a power line plaintiff would have to prove what science and medicine have not yet been able to prove. The plaintiff may offer expert testimony, but because the scientific community has yet to produce even one study showing a causal link between EMFs and cancer, such testimony could be only of the epidemiological type. Basing liability on the results of epidemiological data not only would be improper, but would violate the well-established legal precedent that a plaintiff must prove actual causation to recover in tort.

Despite the difficulty of establishing tort liability, there have been an increasing number of suits filed against defendants who are responsible for emanating some type of electromagnetic energy.

---

82 Keeton, supra note 81, at 269.
83 See id. If health hazards ever are proven, a number of parties could be liable under tort theories. See Young, supra note 47, at 155 n.12. For example, plaintiffs could sue the power companies producing the fields, a state's public service commission for allowing the lines to be constructed, and the manufacturers of the equipment producing the EMFs. Id.
84 See Keeton, supra note 81, at 269.
85 See supra text accompanying notes 43–78.
87 See supra text accompanying notes 43–78.

In the most recent EMF exposure case, filed on January 6, 1992, the plaintiff alleges that EMFs from an electrical substation and surrounding power lines caused the brain tumor of
Many of these suits have settled out of court with certain "gag" provisions imposed on the plaintiffs. Moreover, in the power line context, there has yet to be a decision on any personal injury case. One example of such a case awaiting trial, is a recently filed suit alleging health problems caused by power line EMFs. The plaintiff, suing on behalf of her four-year-old daughter, lived near high-voltage transmission lines and other electrical equipment owned by the San Diego Gas & Electric Company. The plaintiff has developed a rare type of tumor that she argues was a direct result of her exposure to extremely high-level EMFs emanating from the defendant's power lines. The plaintiff also has filed claims of negligence and strict liability, alleging that the potential health problem of EMFs is one about which the power company knew or should have known, and that the transmission of electricity at such high levels is an ultrahazardous activity. Cases such as this one will help determine whether tort causes of action ever will be available to power line plaintiffs.

The number of personal injury suits presently being filed may soon force a judicial interpretation of the tort aspects of power line exposure cases. Many think it is just a matter of time before the floodgates of power line tort litigation open.

Melissa Bullock, a 19-year-old woman living on Meadow Street in Guilford, Connecticut. Connecticut Utilities Sued for Brain Tumor Caused by Power Line Radiation, U.S. NEWSWIRE, Jan. 6, 1992, available in LEXIS, Nexis Library, Current File. The victim and her mother seek to hold the power company liable for compensatory and punitive damages. The mother is also seeking compensation for her emotional distress and for the reduced value of her home. The dangers of EMF exposure on Meadow Street has been the focus of national media attention since 1990. See, e.g., Paul Brodeur, Annals of Radiation: Calamity on Meadow Street, NEW YORKER MAG., July 9, 1990, at 50.


Id. at 3-4.

Id. Power lines allegedly run within 12 feet of their home. Power-Line Radiation Fight Heads to Court, NAT’L J., Aug. 17, 1991, at 2030. According to reports, the suit includes data showing that EMF levels in the plaintiff’s home ranged from 3.5 to 17 mG. Id.

Plaintiff’s Complaint at 4–7, Zuidema (No. 638222). In another case awaiting trial, the plaintiff lived near a 345-kV transmission line that the Houston Lighting & Power Company operated. See Weiss, supra note 38, citing, Plaintiff’s Complaint, Scott v. Houston Lighting & Power Co., No. 87-58967 (Tex. Dist. Ct. filed 1987). The plaintiff was diagnosed at age 26 with a brain tumor that he claimed nearby power line EMFs either caused or made worse. See id., citing Plaintiff’s Complaint at 2–6. The plaintiff filed claims of negligence, alleging the power company knew or should have known the health risks, and strict liability, alleging the transmission of electricity at such high levels is an ultrahazardous activity. See id. The plaintiff also claims that the power company is negligent because they have known of these hazards since the mid-1970s and failed to warn the public. See id.

Telephone interview with Paul Brodeur, NEW YORKER MAG. (Nov. 11, 1990).
gation happens too soon, however, it is likely that science still will not be able to provide the necessary causal link between EMFs and cancer. Mere fear of potential cancer will not be enough for plaintiffs if there is no proof that EMFs cause adverse health effects. In fact, the only way a power line plaintiff will be able to recover under tort law is if judges start drawing their own conclusions from the available scientific findings. This is unlikely to happen, for the available scientific evidence is far too inconclusive to warrant judicial intervention. As a result, power line plaintiffs will have to examine alternative theories of recovery that use the law of property.

IV. POWER LINE CONDEMNATION CASES AND RECOVERY BASED ON FEAR

Nearly all power line case law appears in the context of property law rather than that of personal injury law. Most often, these cases address the validity of the government’s use of its power of eminent domain or the amount of compensation an aggrieved landowner is due. Eminent domain is a government’s power to take private property for public use. The Fifth Amendment of the United States Constitution establishes the scope of the federal government’s eminent domain power, stating that private property shall not “be taken for public use without just compensation.” A governmental entity wishing to invoke its power of eminent domain must act through a condemnation proceeding. In such a proceeding, the issue is to determine what constitutes full compensation for any property taken and for the diminished value of any remaining property.

The potential dangers of power lines have been an issue in many condemnation cases. These cases usually focus on severance damages, which provide compensation for the diminished value of property remaining after a governmental entity partially condemns a property owner’s land. There appear to be three distinct views on the compensability of property value lost as a result of a power

---

95 For a complete discussion of power line condemnation cases, see Young, supra note 47, at 158–69; Weiss, supra note 38, at 365–73.
97 U.S. Const. amend. V. Every state except North Carolina has a similar provision in its constitution requiring payment of just compensation to owners of land taken by eminent domain. Stoebeck, supra note 96, at 5–6.
98 Stoebeck, supra note 96, at 5–6.
99 See id. at 1–3.
100 See Weiss, supra note 38, at 365.
101 Id.
company's condemnation. The majority and most liberal view holds that because the fear of power lines has an impact on the market value of adjacent landowners' property, a condemning power company must compensate landowners even if the landowners fail to prove the reasonableness of their fear.\textsuperscript{102} According to the intermediate view, a diminution in value due to the fears of potential buyers of land near power lines is compensable in eminent domain proceedings only if such fears are reasonably grounded in scientific observation or experience.\textsuperscript{103} The minority view, the strictest of the three, denies any compensation for the diminution of property value due to fear associated with power lines.\textsuperscript{104} Courts adopting the minority view reason that fear of power line exposure is generally unjustified and grounded in ignorance and superstition and thus should not be a factor in determining compensation.\textsuperscript{105}

The majority view, requiring compensation for reduced property values, is clearly presented in \textit{San Diego Gas \& Electric Co. v. Daley}.\textsuperscript{106} In Daley, an electric utility brought a condemnation action to obtain a power line easement across a property owner's land.\textsuperscript{107} The court held that the damages awarded could include damages associated with the public fear of power lines as long as that fear had a depressing effect on the market value of the landowner's remaining property.\textsuperscript{108} Thus, evidence regarding buyer fear of potential dangers associated with EMF exposure was admissible to assist jurors in determining the property owner's severance damages.\textsuperscript{109} The court, however, did not admit the utility's expert testimony that EMFs have no effect on humans or animals.\textsuperscript{110}


\textsuperscript{103} See, e.g., Willsey v. Kansas City Power \& Light Co., 631 P.2d 268, 278 (Kan. 1981); Zappavigna v. State and Power Authority of New York, No. 74065, slip op. at 10-12 (N.Y. Ct. Cl. Sept. 29, 1989); see also Weiss, supra note 38, at 366.

\textsuperscript{104} See Weiss, supra note 38, at 366; see also Alabama Power Co. v. Keystone Lime Co., 67 So. 883, 837 (Ala. 1914).


\textsuperscript{106} 205 Cal. App. 3d at 1344-50.

\textsuperscript{107} \textit{Id.} at 1338-39.

\textsuperscript{108} \textit{Id.} at 1349.

\textsuperscript{109} \textit{Id.} at 1346-47.

\textsuperscript{110} \textit{Id.} at 1349.
to the court, the issue was not whether EMFs were harmful, but whether the public fear of harm had a detrimental effect on the remaining value of the condemnee’s land.\textsuperscript{111}

The most recent power line condemnation case dealing with the fear of EMFs is \textit{Zappavigna v. State & Power Authority of New York},\textsuperscript{112} in which the court upheld the intermediate view that severance damages related to such fear are allowable only if that fear is reasonably based.\textsuperscript{113} In \textit{Zappavigna}, the Power Authority of New York obtained easements for the erection of a power line that would extend over 180 miles.\textsuperscript{114} The court had to determine whether it should allow expert testimony on the issue of direct and consequential damages resulting from the allegedly harmful effects of EMFs.\textsuperscript{115}

The condemnee claimed that due to the present state of science and the attendant publicity regarding potential EMF health risks, a future buyer of land had a reasonable fear of EMFs, and that this fear would cause a decrease in value of that land.\textsuperscript{116} The court, however, refused to follow the majority view enunciated in \textit{Daley}. Instead, it held that a condemnee has the burden of proving, by a preponderance of the available scientific evidence, both that a potential purchaser has reasonable grounds for fear of power line health effects, and that this reasonable fear has affected the market value of the condemnee’s remaining property.\textsuperscript{117} Because the condemnee only satisfied one of these burdens, the court concluded that it could not award compensation based solely on a fear of potential EMF health effects.\textsuperscript{118}

In \textit{Alabama Power Co. v. Keystone Lime Co.}, the court enunciated the minority view.\textsuperscript{119} In a 1914 condemnation proceeding regarding land slated to be the site for electric transmission lines, the court stated that there is no right to compensation for the diminished market value of a condemnee’s property due to a potential buyer’s fear of power lines.\textsuperscript{120}

\textsuperscript{111} \textit{Id.}; see also \textit{Florida Power & Light Co. v. Jennings}, 518 So. 2d 895, 895 (Fla. 1987).


\textsuperscript{113} \textit{Id.}

\textsuperscript{114} \textit{Id.} at 1–2.

\textsuperscript{115} \textit{Id.} at 2.

\textsuperscript{116} \textit{Id.} at 9–10.

\textsuperscript{117} See \textit{id.} at 12, 30–31.

\textsuperscript{118} \textit{Id.} at 30–31; see also \textit{Arkansas Power & Light Co. v. Haskins}, 528 S.W.2d 407, 409–10 (Ark. 1975).

\textsuperscript{119} 67 So. 833, 835–37 ( Ala. 1914).

\textsuperscript{120} \textit{Id.}
Company decision this was the majority view, only a few states currently follow this reasoning.\textsuperscript{121}

Heightened public concern over the potential health effects of EMFs has shifted the views of many courts regarding the role of fear in condemnation proceedings. There are still a few courts that refuse to award compensation solely on the basis of a buyer's fear of power lines, and others that allow compensation only if a potential buyer's fear of power lines is reasonably based. The majority of courts, however, have rejected these views. The task in the majority of states has not been to resolve whether EMF exposure is dangerous, but rather to determine whether a fear of danger from EMF exposure is present and consequently affects the market value of the condemnee's property.\textsuperscript{122} Therefore, expert testimony regarding EMF health effects on humans is irrelevant, for the only concern in the majority of states is whether the fear of potential health effects has diminished the market value of a condemnee's property.

Property owners whose land is condemned for power line right of ways likely will be able to take advantage of the tremendous public concern over the potential health effects of EMFs. In most jurisdictions, a showing that the public's fear of EMFs has affected the market value of a condemnee's property is sufficient to allow severance damages based on that lost market value. Although power line plaintiffs are not engaged in these types of condemnation proceedings, a liberal jurisdiction that allows severance damages based on fear nonetheless may be helpful to these plaintiffs. This is mainly due to the fact that the concept of fear will be significant to power line plaintiffs who claim that a taking of their property has occurred.

V. UNCONSTITUTIONAL TAKINGS AND INVERSE CONDEMNATION

Landowners who believe that their property is being exposed to particularly high-level EMFs, or who are experiencing nuisance injuries as a result of their proximity to such EMFs, should consider filing an inverse condemnation suit claiming that the government has taken their land for public use. Plaintiffs filing inverse condemnation suits may invoke their constitutionally established right to

\textsuperscript{121} See, e.g., Pappas v. Alabama Power Co., 119 So. 2d 899, 905 (Ark. 1960) (rejecting damage claims based on fear of power lines remains sound policy); Casey v. Florida Power Corp., 157 So. 2d 168, 170–71, (Fla. Dist. Ct. App. 1963) (unfair for jury to base compensation on fear); see also Weiss, supra note 38, at 366.

compensation only upon a showing that the government has taken part of their property interest in their land.\textsuperscript{123} As a result, a power line plaintiff bringing such a suit would have to demonstrate to a court that the presence of nearby power lines emitting high-level EMFs is enough to constitute a taking of the plaintiff's property. Power line plaintiffs who use the United States Supreme Court's takings analysis, as well as the reasoning in analogous airspace easement and taking by nuisance cases, may find feasible legal recourse.

\textbf{A. The Supreme Court's Takings Analysis}

Although the Fifth Amendment's Just Compensation Clause governs the federal government's power of eminent domain, it has become well-established that application of the clause is not limited to cases involving a government's direct and deliberate acquisition of a person's private property.\textsuperscript{124} Rather, property owners may receive compensation for many other types of governmental actions that interfere with their rights and interests.\textsuperscript{125} The Court, however, has not clearly defined the various forms of interference that are compensable as takings of private property.\textsuperscript{126} In fact, rather than developing a set formula for determining what constitutes a taking, the Court has adopted a case-by-case factual approach.\textsuperscript{127} Nonetheless, the Court has developed two broadly defined factors that are of particular significance in determining whether a governmental activity in fact may be a taking. It will look at the character of the governmental action, and it will consider the economic impact of that action, particularly the extent to which the action interferes with the property owner's "reasonable investment-backed expectations."\textsuperscript{128}

The Supreme Court has recognized that physical invasions or appropriations\textsuperscript{129} as well as regulatory actions\textsuperscript{130} may constitute a

\begin{footnotesize}
\textsuperscript{123} See U.S. Const. amend. V. The majority of states have similar "taking" clauses. See, e.g., Ind. Const. art. I, § 18; Mass. Const. Part I, art. 10; Mich. Const. art. XIII, § 1; N.Y. Const. art. I, § 7.


\textsuperscript{125} Id.

\textsuperscript{126} Id.


\textsuperscript{130} See First English Evangelical Lutheran Church of Glendale v. County of Los Angeles, 482 U.S. 304, 316 (1987); Pennsylvania Coal Co. v. Mahon, 260 U.S. 393, 395 (1922).
\end{footnotesize}
taking of private property within the meaning of the Fifth Amend-
ment. The economic impact of these actions also has played a signif-
icant part in the Court's taking analysis.131 The fact that a govern-
mental entity has deprived a property owner of the most profitable
use of the property or caused a reduction in the market value of the
property will be relevant in the determination of whether or not a
taking has occurred.132 All of these factors may be applicable to a
power line plaintiff's case. In the power line context, however, the
character of the invasions and the resulting economic impact are
more analogous to those invasions and economic impacts articulated
in airspace easement cases and taking by nuisance cases.

B. Taking by Airspace Easement

Ownership of land generally includes ownership of airspace above
the surface of the land.133 The antiquated decree of our law, "[w]hose
is the soil, his it is up to the heavens"134 has no place, however, in
the contemporary world.135 Modern case law and common sense
dictate that a landowner has no property rights in the airspace at
altitudes where aircraft commonly fly.136 Landowners do have prop-
erty rights, however, in airspace near the surface of their land.137
The United States Supreme Court has recognized that when the
government uses the airspace overlying parcels of private property
and thereby disrupts the property owners' use and enjoyment of
their land, it may have effected a taking of property for which
compensation is due.138

For example, in *Portsmouth Harbor Land & Hotel Co. v. United
States*,139 plaintiffs sought compensation when a government fort
fired shots over their property.140 The Court reasoned that the firing,
as well as the imminent threat of firing, imposed a servitude upon
the plaintiff's land, and held that such conduct amounted to a taking
of that servitude for public use.141 Damages in *Portsmouth Harbor

131 See *Loretto*, 458 U.S. at 426.
132 See *Theuman*, supra note 124, at 984–85.
133 See *STOEBUCK*, supra note 96, at 153.
134 Id.
136 See *STOEBUCK*, supra note 96, at 153.
137 See id.
138 See *Theuman*, supra note 124, at 1008.
139 260 U.S. 327 (1922).
140 Id. at 328.
141 Id.
Land were based on the value of the use of the airspace, and severance damages were awarded for the decrease in market value of the landowner's property as a result of the passing shots.142

The Court applied the reasoning of Portsmouth Harbor Land to the issue of airplane overflights in United States v. Causby.143 In Causby, the plaintiff sued the government in inverse condemnation, claiming that the low flights of United States military planes over his chicken farm had destroyed the use of his property and caused him to suffer from loss of sleep, nervousness, and fright.144 According to the Court's reasoning, aircraft flights that are so low and frequent as to be a direct and immediate interference with the use and enjoyment of land are as much of a taking of that land as a more traditional invasion or appropriation.145 Consequently, the Court held that the government had imposed upon the plaintiff's land a servitude, or a "navigation easement," for which the plaintiff was entitled to compensation under the Fifth Amendment.146

While not directly stating so, the Court in Causby alluded to the necessity of some form of invasion before recovery could be granted.147 It suggested in dictum that landowners' possessory interests need not be destroyed to constitute a taking,148 and made it clear that extremely low and frequent flights may be a sufficient infringement on property owners' use and enjoyment of their land to constitute a Fifth Amendment taking.149 Thus, it is the "character of the invasion, not the amount of damage resulting from it," that determines whether a governmental activity constitutes a taking.150

The Supreme Court subsequently upheld this reasoning in Griggs v. Allegheny County.151 In Griggs, a county airport allowed frequent flights at very low altitudes over the plaintiff's property, which eventually caused him and other occupants of his property to move from their homes.152 The Court held that the noise, vibrations, and fear associated with the low overflights had so interfered with the plaintiff's use and enjoyment of his property that the flights

142 Id.
143 328 U.S. 256, 262–63 (1946).
144 Id. at 258–59.
145 Id. at 264.
146 See id. at 267.
147 See id. at 265.
148 See id. at 261–62.
149 Id. at 266–67.
150 Id. at 266 (quoting United States v. Cress, 243 U.S. 316, 328 (1916)).
151 369 U.S. 84 (1962).
152 Id. at 87.
amounted to an unconstitutional taking. It reasoned that the plaintiff’s property had become undesirable and unbearable for residential use, and that the County therefore had taken an airspace easement over the plaintiff’s property—an easement for which compensation was due. It thus is evident from Portsmouth Harbor Land, Causby, and Griggs that the degree to which an aircraft physically invades a plaintiff’s property is an important consideration for the Supreme Court when it is deciding airspace easement cases. The Court has not addressed directly, however, whether it considers physical invasion to be the decisive factor in an airspace takings case.

In contrast, the lower federal courts have addressed this issue directly, holding that an actual physical invasion is necessary for aircraft overflights to be considered a taking of private property. For example, in Batten v. United States, jet aircraft operations at a military base subjected nearby property owners to smoke, vibrations, and extreme noise. The United States Court of Appeals for the Tenth Circuit reasoned that a taking only occurs if an aircraft flies directly over a landowner’s property. Thus, the amount of interference that the airplanes at the military base caused to the plaintiffs’ enjoyment of their property was irrelevant because it did not deprive the landowners of all or most of their interest in their property—the aircraft did not invade their airspace. Furthermore, the court determined that the Fifth Amendment provides just compensation only for property that is taken, not for property that is damaged. Thus, although the vibrations and smoke may have “damaged” the property in Batten, the court held that the Constitution did not require compensation.

The dissent in Batten has had much influence on state common law, and courts frequently cite it as the more logical approach to the

153 Id. at 91 (Black, J., dissenting).
154 Id. at 89.
156 See Branning v. United States, 654 F.2d 88, 99 (Ct. Cl. 1981); Avery v. United States, 330 F.2d 640, 645 (Ct. Cl. 1964); Batten v. United States, 306 F.2d 580, 584 (10th Cir. 1962).
157 306 F.2d 580 (10th Cir. 1962).
158 Id. at 580.
159 See id. at 584.
160 See id. at 585.
161 See id. at 583–84.
162 See id.
issue of overflight takings. In his well-known dissent in *Batten*, Justice Murrah argues that, in determining whether the government has inversely condemned private property by infringing on landowners' use and enjoyment of their land, courts perform a two-part analysis. They consider first whether there is an interest that the law protects; and second, whether the interference is sufficiently direct and peculiar, and of such a magnitude, that it would be unfair for the individual property owner to bear the burden alone. In essence, Judge Murrah recognized that, if substantial enough, a common law nuisance may constitute a taking.

Nonetheless, virtually all of the lower federal courts that have addressed this issue have adopted the majority's reasoning in *Batten*. In *Avery v. United States*, for example, the plaintiffs sought compensation from a United States Naval Air Station for the taking of easements over thirty-three different parcels of land. No aircraft had physically invaded the airspace over certain of these parcels of land. Thus, the United States Court of Claims held that there was no taking of property with regards to those parcels. According to the court, there was no case law supporting the proposition that the invasion of property by sound and shock waves from nearby aircraft may constitute an actual physical taking rather than a mere trespass or nuisance.

In *Avery*, however, there were also many parcels of land upon which there were actual physical invasions. The United States already had acquired perpetual easements and rights-of-way for the unobstructed passage of its aircraft over some of these parcels.

---

163 See, e.g., Martin v. Port of Seattle, 391 P.2d 540, 545 (Wash. 1964); Thornburg v. Port of Portland, 376 P.2d 100, 104 (Or. 1963).
164 See *Batten v. United States*, 306 F.2d 580, 687 (Murrah, J., dissenting).
165 See *id.*
166 See *id.* For a discussion of takings by nuisance, see infra text and accompanying notes 177–221.
168 *Avery*, 330 F.2d at 641.
169 See *id.*
170 *Id.* at 643–44.
171 *Id.* at 645.
172 *Id.* at 642.
173 *Id.*
Despite this fact, the court held that, with regard to those particular parcels, a new and further taking of property had occurred. Its conclusions were based on three factors: the increase of airport operations; the introduction of larger, noisier aircraft; and the sharp decrease in property values of nearby residences. In other words, the court concluded that a Fifth Amendment taking may occur when a government's activity increases beyond the scope of its original condemnation award.

**C. Taking by Nuisance**

While actual physical invasions frequently are present in takings cases, some courts nonetheless have recognized that a taking does not necessarily depend on whether a government action physically invades a plaintiff's property. The government may accomplish the equivalent of an outright physical invasion through some form of indirect interference, like that of a nuisance.

A nuisance is an interference with the use and enjoyment of land. Usually, such an interference must be substantial and unreasonable in order to constitute an actionable nuisance. That is, the plaintiff must suffer a significant harm, and it must be unreasonable to allow the defendant to cause such an intentional harm without compensating the plaintiff. Interferences cannot be mere inconveniences such as occasional bursts of smoke or unpleasant odors, although if substantial enough, even these seemingly incidental nuisances may be actionable. In nuisance actions, courts may consider various fears and feelings that are common to most people within a community. For example, in one case, property owners' fear of contagion from a nearby tuberculosis sanitarium was sufficient to constitute a nuisance despite the fact that this fear lacked any scientific foundation.

---

175 *Id.* at 643.
176 *Id.*
177 *See, e.g.,* Pennsylvania Coal Co. v. Mahon, 260 U.S. 393, 395 (1922) (governmental regulation went so far as to constitute a taking).
179 *Keeton, supra* note 81, § 87, at 619.
180 *Id.*
181 *Id.*
182 *Id.*
183 *Id.*
184 *Id.*
185 *See* Everett v. Paschall, 111 P. 879, 880 (Wash. 1910).
Plaintiffs seeking recovery for a common law nuisance often will be better off claiming that the alleged nuisance is substantial enough to constitute an unconstitutional taking of property. Although the federal government and many state governments may be sued in tort, the general limitation in nuisance suits is that activities performed pursuant to a statute cannot constitute a nuisance. While the activity must be within legislative authority, and the statute may not authorize unreasonable interference with the enjoyment of property, certain governmental immunities nonetheless may present hurdles that do not exist in inverse condemnation suits.

Although not labeled as such, the reasoning articulated in taking by nuisance cases has existed since the early parts of this century. The earliest such cases awarded compensation for nuisances caused by garbage dumps and sewage disposal plants. More recently, courts have applied similar reasoning to cases in which disturbances resulted from aircraft flights alongside a property owner's land—a situation that would preclude recovery under the theory underlying the majority of airspace easement cases, which have required direct physical invasions.

The Oregon Supreme Court became one of the first modern courts to recognize the taking by nuisance theory, in *Thornburg v. Port of Portland*. In *Thornburg*, the plaintiff sought compensation for the noise disturbance that occurred when jet aircraft landed at a nearby airport. It was impossible for the plaintiff to recover under an airspace easement theory because many of the aircraft passed adjacent to and not directly over the plaintiff's property. Nonetheless, the court held that the nuisance resulting from the noise of the aircraft could constitute a taking. It emphasized the extent to which the governmental activity of operating the airport interfered with the plaintiff's property, rather than the question of whether

---

186 See Stoebuck, supra note 96, at 164.
187 See id. at 164–65.
188 Id. at 161.
189 See Ivester v. City of Winston-Salem, 1 S.E.2d 88, 88 (1939) (odors, rats, ashes, smoke, and insects from sewage plant next to plaintiff's land constituted nuisance and taking of property); City of Louisville v. Hehemann, 171 S.W. 165, 166 (Ky. 1914) (odor and flies from adjacent dump constituted taking of property); City of Georgetown v. Ammerman, 136 S.W. 202, 203 (Ky. 1911) (odors from city dump next to plaintiff's land created nuisance that was taking of property).
190 See supra text accompanying notes 133–76.
191 376 P.2d 100 (Or. 1962).
192 Id. at 101.
193 See id. at 103.
194 See id. at 106. The Oregon Constitution only provides compensation for people whose property is “taken”; it does not compensate landowners whose property is “damaged”. See id.
there was an actual trespass. The court suggested that it is illogical to claim the government takes an easement over private property when aircraft fly directly over the land, but does not take an easement when aircraft fly a few feet to either side of the property owner's airspace. According to the court, the infringement on the plaintiff's use and enjoyment of its land is the same in either case. Thus, a taking may occur whenever a governmental entity acts in a way that substantially deprives landowners of the useful possession of their property, either by repeated trespass or by repeated non-trespassory invasions that amount to a nuisance.

The Thornburg decision directly contradicts the physical invasion requirement enunciated in Batten. Nonetheless, there has been a significant following of Thornburg in many state law decisions. Moreover, those states that have abandoned the Batten direct over-flight requirement in favor of the Thornburg nuisance theory have been able to avoid the Thornburg court's takings analysis and still find a taking. Many have circumvented the Batten rule by using their own state constitutional provisions requiring just compensation whenever property is either taken or damaged. In Martin v. Port of Seattle, for example, the plaintiffs claimed a decline in property value due to the Port of Seattle's damaging and taking of their property through nearby low-altitude jet aircraft flights. The Washington Supreme Court held that there could be a taking and damaging of property, within the meaning of a state constitutional provision, by airplane operations and flights regardless of whether the planes flew directly over the plaintiff's land.

---

196 Thornburg, 376 P.2d at 106–07.
196 Id. at 109.
197 See id.
198 Id. at 107.
199 Id. at 104. Many commentators argue the Batten rule is illogical. See, e.g., Richard A. Epstein, Takings: Private Property and the Power of Eminent Domain 51 (1985).
201 See, e.g., City of Jacksonville v. Schumann, 167 So. 2d 95, 99 (Fla. Dist. Ct. App. 1964); see also Johnson, 435 S.W.2d at 481; Henthorn, 453 P.2d at 1015–16; Aaron, 40 Cal. App. 3d at 484–85.
202 At least twenty-five states have such damage provisions. See, e.g., Ariz. Const. art. II, § 17; Ark. Const. art. II, § 22; Cal. Const. art. I, § 14; Or. Const. art. I, § 16.
204 Id. at 543. The Washington Constitution states that "[n]o private property shall be taken or damaged for public or private use without just compensation having first been made...." Wash. Const. art. I, § 16.
205 Martin, 391 P.2d at 547.
Because the Washington Constitution provides compensation for landowners whose property has been "damaged," the Washington Supreme Court in Martin could have found an unconstitutional taking without contradicting Batten. Nonetheless, the court flatly rejected the Batten rule requiring direct invasions and adopted the Thornburg reasoning instead. The Martin court suggested that it is not the location of the undesirable activity, but rather the interference with the landowners' enjoyment of their land, that determines whether a court should award them compensation. Moreover, the court could not accept the premise that recovery for interference with their land should be based upon something so trivial as whether part of an airplane's wing passes through some fraction of an inch of the airspace directly above their property.

The landowners in Martin, according to the court, were not seeking recovery for a technical trespass but rather for a combination of circumstances, caused by the nearby flights, that interfered with the use and enjoyment of their land.

The United States Supreme Court has not directly addressed the taking by nuisance theory, but nonetheless implicitly has recognized that a government-caused nuisance may constitute a taking. In Richards v. Washington Terminal Co., the plaintiff owned a brick house that was located within 114 feet of the defendant's railroad tunnel. The plaintiff claimed that the railroad had partially destroyed and thus inversely condemned his property interest in enjoyment. The Court decided that the plaintiff was not entitled to compensation for damages caused by the usual smoke and gases emitted from the tunnel by reason of the proper operation of the railroad. This type of interference, the Court opined, is normally associated with railroads and is of the kind and degree suffered by all persons along the track. The Court held, however, that the blasts of smoke and gas from the mouth of the tunnel onto the plaintiff's land imposed such a direct, peculiar, and substantial bur-

---

206 See id. at 546.
207 Id. at 545.
208 Id. at 546-47.
209 Id. at 545.
210 Id.
212 233 U.S. 546 (1914).
213 Id. at 549.
214 Id. at 548.
215 Id. at 555-57.
216 Id. at 555.
den on his use and enjoyment of his property that they constituted a taking of private property for public use.\textsuperscript{217} The Supreme Court also implied that railroads are constructed for public use and treated as public highways.\textsuperscript{218} Thus, using public policy as its justification, the Court reasoned that landowners situated next to railroad lines have no right to property claims for ordinary damages attributable to the railroad's public operation.\textsuperscript{219} The Court placed heavy emphasis on balancing the public benefits of having railroad transportation against the private nuisances involved with residing in close proximity to railroad lines.\textsuperscript{220} Nonetheless, while a legislature may legalize what would otherwise be a public nuisance, it may not create governmental immunity from a private nuisance action of such a substantial character that it amounts to a taking of private property.\textsuperscript{221}

VI. \textbf{THE POWER LINE PLAINTIFF AND INVERSE CONDEMNATION}

The number of condemnation suits that power companies file is substantial, and such suits have existed almost as long as high-voltage power lines themselves. Inverse condemnation suits are equally prevalent, albeit a more recent development. In the majority of inverse condemnation cases, plaintiffs seek compensation for an actual physical appropriation that already has occurred or that is about to occur.\textsuperscript{222} Because the human senses cannot perceive EMFs, this traditional approach will be a difficult theory for power line plaintiffs to pursue. Nonetheless, a plaintiff still may be able to recover for EMF exposure under the theory of inverse condemnation by analogizing its situation to those in which courts already have liberalized their interpretations of what constitutes a physical invasion and what constitutes a taking.

Until science proves that EMFs cause cancer, a power line plaintiff commencing an inverse condemnation suit against a power company must try to draw analogies to airspace easement cases and taking by nuisance cases. In order to recover, plaintiffs will have to show that EMFs are enough of an interference with their use and enjoyment of their land to constitute a taking of their property. They may

\begin{itemize}
\item \textsuperscript{217} Id.
\item \textsuperscript{218} Id. at 553--54.
\item \textsuperscript{219} Id. at 553.
\item \textsuperscript{220} See id. at 553.
\item \textsuperscript{221} See id.
\item \textsuperscript{222} See SACKMAN, \textit{supra} note 13, § 6.21[1], at 6-136.
\end{itemize}
analogize either to the types of physical invasions that constitute a taking of an airspace easement or to the disturbances necessary to establish a taking by nuisance. At the same time, power line plaintiffs must show that the government's activity burdened them with some detrimental economic effect. For example, evidence demonstrating that a plaintiff’s property value has decreased because of the existence of nearby power lines probably will suffice.

A. The Power Line Plaintiff and Taking by Airspace Easement

The Causby and Griggs line of cases may provide a feasible, although difficult, option for a power line plaintiff to pursue. Causby and its progeny hold that in order to recover for the taking of an airspace easement, landowners must show that the government, or an entity with the power of condemnation,\(^ \text{223} \) physically entered and interfered with their domain.\(^ \text{224} \) These cases have held that continuous invasions of the airspace above such plaintiffs’ property have the same impact as surface invasions.\(^ \text{225} \)

To argue successfully that a power company has inversely condemned a plaintiff’s land, power line plaintiffs must contend that the EMFs emitted from nearby power lines constitute an actual physical invasion of their land, similar to gunshots or airplanes passing through their superadjacent airspace.\(^ \text{226} \) Although power line plaintiffs probably will not have to show a total destruction of their possessory interest, they undoubtedly will have to show that the power company’s action constitutes some immediate interference with their use and enjoyment of their property.\(^ \text{227} \)

Interpreting the Causby and Griggs line of cases liberally, power line plaintiffs may be able to claim that, in certain situations, EMF fields represent as much of a physical invasion as aircraft flying through a property owner’s airspace and thus similarly effect an unconstitutional taking.\(^ \text{228} \) The difficulty with this analysis, however, is that power line plaintiffs must convince courts that an actual physical invasion has occurred. In addition, they must show that this invasion has interfered with their property to the same extent that

\(^{223}\) Because power companies are licensed by the government, they are treated as governmental entities. \(\text{Id. } \S \text{3.232}[2], \text{at 3-236.}\)

\(^{224}\) See supra text accompanying notes 133–55.

\(^{225}\) See, e.g., United States v. Causby, 328 U.S. 256, 265 (1946).

\(^{226}\) See id. at 264–65; Portsmouth Harbor Land & Hotel Co. v. United States, 260 U.S. 327, 329–30 (1922).


\(^{228}\) See Causby, 328 U.S. at 264–65.
aircrafts did in the *Causby* and *Griggs* line of cases. Thus, a power line plaintiff’s biggest challenge under this theory is establishing that EMFs—something humans can neither see nor hear—do physically invade a landowner’s airspace. If the courts recognize EMFs as something capable of a common law trespass, a judge may be more likely to accept the premise that EMFs physically invade property in a legal sense. By utilizing the reasoning from the famous trespass case *Martin v. Reynolds Metals Company*, this may be possible.

In *Reynolds Metals Company*, landowners brought a trespass action against an aluminum manufacturer, claiming that the defendant’s manufacturing operation caused certain fluoride compounds, in the form of gases and particles, to trespass onto the plaintiff’s land. The Supreme Court of Oregon held that this invasion by the compounds, despite its invisibility to the naked eye, did constitute a direct trespass. The *Reynolds Metals Company* court reasoned that, because of advancement in scientific capabilities—particularly in regard to the “atomic world of small particles”—certain objects need not be visible to be considered capable of committing a trespass. According to the court, whether an invasion upon another’s property has occurred turns on the character of the invading instrumentality. In other words, the emphasis is on the invading object’s energy or force rather than its size or visibility. The court went on to define trespass as any intrusion that invades a landowner’s protected interest in exclusive possession, “whether that intrusion is by visible or invisible pieces of matter or by energy which can be measured only by the mathematical language of the physicist.”

Using *Reynolds Metals Company*, a power line plaintiff will want to show that EMFs are fields of measurable energy that the naked eye is simply unable to perceive. As a result, a court may be able to accept the argument that unreasonably high-level EMFs can commit a trespass in the same way that the invisible fluoride compounds

---

229 See supra text accompanying notes 133–55.
230 342 P.2d 790 (Or. 1959).
231 Id. at 791–92.
232 Id. at 794.
233 Id. at 793.
234 Id. at 794.
235 Id.
236 Id. The court also stated, however, that the conduct of the defendant in a particular case will not be actionable if it does not violate a plaintiff’s legally protected interest, and if the defendant’s conduct does not cause actual damage. Id.
in Reynolds Metals Company could undertake a physical invasion.\footnote{237}{The best method for power line plaintiffs would be to measure the various field strengths both surrounding and within the confines of their property. Comparing these levels to those that the average citizen endures on a daily basis may be sufficient to demonstrate an unreasonable invasion.}} According to the Causby and Griggs line of cases, however, it is not enough that a judge believes EMFs can commit an actual physical invasion—there needs to be evidence of actual damage as a result of this invasion. In Causby, there was a substantial interference with the plaintiff’s livelihood;\footnote{238}{See United States v. Causby, 328 U.S. 256, 262 (1946).} in Griggs, the plaintiff’s property was considered unsuitable for residential use.\footnote{239}{See Griggs v. Allegheny County, 369 U.S. 84, 87 (1962).} Similarly, power line plaintiffs will need to show that, in addition to a physical invasion by measurable EMFs, there also has been some infringement on the plaintiffs’ use and enjoyment of their property. Power line plaintiffs experiencing additional disturbances from power lines—such as loud noises, vibrations, buzzing, or electric shocks—may be more likely to succeed on such a claim.

While the Avery case follows the actual physical invasion rule of Batten, its ultimate holding nonetheless may provide a power line plaintiff with an additional argument based on an “expanded easement” theory.\footnote{240}{See Avery v. United States, 330 F.2d 640, 643 (Ct. Cl. 1964).} The Avery court found that a further taking can occur as a result of new developments that affect a previously existing easement.\footnote{241}{Id.} In power line condemnation cases, just compensation for a power company’s easement usually is based on either the value of the easement taken or the decrease in the property value of the remaining land.\footnote{242}{See Sackman, supra note 13, § 6.01, at 6-4.} Analogizing to Avery may provide a power line plaintiff who already has received compensation for an original easement additional compensation for the subsequent taking of an “expanded easement.”

For an illustration of this “expanded easement” argument, consider the following situation. In 1960 the government awarded a power line plaintiff compensation for a thirty-foot right-of-way located in the plaintiff’s back yard. The power company uses this easement to provide for the passage of high-voltage power lines. Further assume that compensation for the 1960 easement was based on two factors: the value of the physical easement—thirty feet of land and airspace—and the effect on the land’s market value due to
fears associated with high-voltage power lines being in such close proximity to the property owner.\textsuperscript{243} In 1991, this plaintiff may be able to use the theories advanced in \textit{Avery} to claim that the power company has extended its activities beyond the bounds of the 1960 easement and thus should compensate the plaintiff for an additional taking.

\textit{Avery} based its analysis of an “expanded easement” on three factors: the airport’s increased operations; the development of larger and noisier planes; and the decrease in property values as a result of these new developments.\textsuperscript{244} Many power companies have experienced a similar expansion over the past several decades. Our hypothetical power line plaintiff will want to claim that since 1960, the demand for electric power has grown significantly.\textsuperscript{245} As a result, the currents flowing through high-voltage power lines have increased, emanating more powerful and expansive electromagnetic fields. It is also likely that since 1960, the higher demand for electric power has created newer, possibly additional high-voltage wires to be placed within the confines of the 1960 easement, adding to the already existing EMFs. Finally, it is evident that the publicity regarding the potential health effects of EMFs over the past decade, and during the past few years in particular, has had a tremendous impact on property values.\textsuperscript{246}

Power line plaintiffs analogizing to the “expanded easement” argument of \textit{Avery} still will have to demonstrate that the alleged expansion has infringed on their use and enjoyment of their property.\textsuperscript{247} Plaintiffs must claim that the infringement results from loss of sleep and mental anguish associated with their increasing knowledge of the potential health effects of EMFs, as well as from the decrease in the market value of their property. Power line plaintiffs should perform actual measurements of EMFs near their property

\textsuperscript{243} The public became concerned about power-frequency fields in the 1960s as power companies satisfied the demand for more electricity by constructing more and more power lines. \textsc{Biological Effects}, \textit{supra} note 6, at 1. During this time, however, most of the public’s concern focused not on potential biological effects of magnetic fields, but on the various nuisance effects of their electric fields. \textit{Id.} These effects included noise and vibrations, television and radio interference, and electric shocks that occur when a person underneath high-voltage transmission lines touches metal objects. \textit{Id.} For the purposes of this illustration, it is these effects that caused the market value decrease in the original condemnation proceeding.

\textsuperscript{244} \textit{See Avery}, 330 F.2d at 643.

\textsuperscript{245} It should not be too difficult for power line plaintiffs to compile statistics on the increased dose of electric power.

\textsuperscript{246} \textit{Freeman}, \textit{supra} note 9, at 20.

\textsuperscript{247} \textit{See Avery}, 330 F.2d at 643.
in order to provide courts with evidence of invasions by significant amounts of energy. Given the tremendous amount of publicity surrounding potential EMF health effects, a jury may feel that such fear is a source of substantial interference to a property owner's use and enjoyment of their land.\textsuperscript{248} High levels of EMFs may be enough to justify such fears.

As far as property values are concerned, power line plaintiffs should gather evidence demonstrating the decrease in the market value of their property. Again, because of recent EMF publicity, this will be a relatively easy task. It is important to note, however, that a reduction in market value standing alone may not be enough to constitute interference with power line plaintiffs' use and enjoyment of their property.\textsuperscript{249} Power line plaintiffs still must prove a direct invasion and demonstrate physical manifestations that interfere with the use and enjoyment of their property. Plaintiffs unable to do so may want to circumvent the direct invasion requirement altogether and pursue a taking by nuisance theory.

\textbf{B. The Power Line Plaintiff and Taking by Nuisance}

Power line plaintiffs may be more successful if they litigate their inverse condemnation suits using a taking by nuisance theory. In pursuing the theory of taking by nuisance articulated in \textit{Thornburg},\textsuperscript{250} they would avoid having to prove the physical invasion element of inverse condemnation. The nuisance theory is different from the \textit{Causby/Griggs} physical invasion analysis in that a landowner exposed to EMFs would not be asking for compensation based on an airspace easement that a power company actually had taken.\textsuperscript{251} Instead, plaintiffs alleging a condemnation by nuisance would ask the court to recognize that the power lines in question have created

\textsuperscript{248} This argument would be even stronger for power line plaintiffs who lived in a neighborhood where there were already a number of reported cancer cases. A jury may perceive the fear involved in such a situation as substantial enough to constitute an unreasonable interference with power line plaintiffs' use and enjoyment of their land. See \textit{Keeton}, supra note 81, \textsection 88, at 628–29.

\textsuperscript{249} See, e.g., Twitty v. State of North Carolina, 354 S.E. 2d 296, 304 (N.C. 1987). The \textit{Twitty} court interpreted an earlier North Carolina Supreme Court case, \textit{Long v. City of Charlotte}, 283 S.E.2d 101 (N.C. 1982), as requiring that there be an actual interference sufficiently substantial to reduce the market value of the plaintiff's property. 354 S.E. 2d at 304.

\textsuperscript{250} See \textit{Thornburg v. Port of Portland}, 376 P.2d 100, 105–06 (Or. 1963).

an unreasonable interference with their use and enjoyment of their property.252

Power line plaintiffs adopting this theory should stress that the fear involved with living near a power line is in itself an interference with their use and enjoyment of their property.253 Although the scientific facts concerning the possible health risks of EMFs are not definitive, the tremendous public concern over the issue may add substantial substance to the fears of property owners, particularly in the minds of the jurors. As noted earlier, whether this fear is justified is not relevant to the determination of compensation in many condemnation proceedings.254 In fact, the majority of courts in condemnation suits hold that the truth of whether or not EMFs cause a health threat to humans is immaterial.255 In these jurisdictions, only proof of decreased property value is relevant.

Presently, the United States Court of Appeals for the Sixth Circuit and over twelve states follow this majority position.256 There are an additional ten states that allow such property loss to be compensable upon a showing that the fear of EMF exposure has a reasonable basis.257 Thus, the real questions in these cases are whether a fear exists and whether that fear has affected the market value of the

---

252 See *Thornburg*, 376 P.2d at 110. In *Thornburg*, the Supreme Court of Oregon allowed recovery despite the fact that the Oregon Constitution provided compensation only for the taking of property, not for the "damaging" of property. OR. CONST. art. I, § 18. In addition, while many state jurisdictions have supported the *Thornburg* theory, several state courts nonetheless have used the "damaging" provisions in their constitutions as a basis for recovery. See, e.g., *Martin v. Port of Seattle*, 391 P.2d 540, 545 (Wash. 1964). A state constitution that provides for compensation when property is "damaged" will allow a court to grant recovery without contradicting the *Batten* physical invasion requirement, as the Oregon Supreme Court held in *Thornburg*. See *Thornburg*, 376 P.2d at 104.

253 Power line plaintiffs may want to consider filing common law tort claims of nuisance. In doing so, however, a potential plaintiff will encounter many problems that do not exist with a constitutional claim. For example, the plaintiffs will need to show personal injury in a nuisance claim. See *Keeton*, supra note 81, § 87, at 622-23. In addition, the interference with the use and enjoyment of land must have been intentional in order to recover under a nuisance theory. *Id.* at 622. Further, a loss in property value alone would probably not constitute a substantial harm for nuisance purposes. See, e.g., *Twitty v. State of North Carolina*, 354 S.E. 2d 296, 304 (N.C. 1987). And finally, statutes of limitations do not apply to inverse condemnation suits, and there may be certain governmental immunities to a nuisance claim that may not be present with a constitutional claim. See *Sackman*, supra note 13, § 8.01; *Stoebuck*, supra note 96, at 165. Some of these problems also arise in inverse condemnation cases, but because such cases deal with constitutional claims, the government likely will have fewer defenses.

254 See supra text accompanying notes 95-122.


257 Weiss, supra note 38, at 367.
property. If power line plaintiffs can show that constant fear and apprehension of EMF exposure has infringed upon their right to use and enjoy their property, they may be able to recover in a state that has recognized fear as compensable in condemnation proceedings. 258

Whether seeking recovery using a Thornburg theory or a “damaging” provision of a state constitution, power line plaintiffs nonetheless must demonstrate the existence of some physical manifestations that has led to an interference with their use and enjoyment of their property. In aircraft overflight cases, these manifestations have included noise, vibrations, and fear.259 Similarly, power line plaintiffs must show that there exists some physical manifestations—such as loud buzzing, electric shocks, or television interference—that interferes with their use and enjoyment of their land.

Power line plaintiffs may recover if they are able to show a measurable reduction in the market value of their property resulting from the existence of significant levels of EMFs. They also must show that the interference with their use and enjoyment of their property is so substantially direct and peculiar that they, if uncompensated, would pay more than their proper share of the total cost of having electricity.260 Proving a decrease in a property’s market value because of the existence of high EMF levels, and proving a disproportionate financial burden on a particular power line plaintiff as compared to the general public, will not be difficult. Nevertheless, even without the Causby/Griggs requirement of showing an actual physical invasion by EMFs, proving that a power company has substantially caused an interference with power line plaintiffs’ uses and enjoyment of their property will be difficult. EMF exposure does not rise to the same level of disturbance as noise and vibrations from nearby aircraft.261 Thus, unless a jury can see fear of EMF

258 No court yet has compensated owners of condemned land for their own fear of power lines or for the possibility that a power line could harm persons or property in the future. See Young, supra note 47, at 162. Nonetheless, it is important to note that power line plaintiffs using this taking by nuisance theory would not be claiming compensation based upon their own fears of power lines, or their fear of future harm. Instead, such plaintiffs will be claiming that the fear itself—arguably caused by the power companies’ inability to prove that their EMFs have no adverse effects on human health—is a direct interference with the plaintiffs’ use and enjoyment of their property. Fear alone, however, will not suffice as a basis for recovery if it is the only interference that plaintiffs claim.


261 Some landowners have claimed that they receive actual electric shocks whenever they walk in their backyard. Physical nuisances such as this may be enough to constitute a taking if coupled with the factors of fear and decrease of property values. See, e.g., High Voltage Debate, NAT'L J., Aug. 17, 1991, at 2027.
exposure as independently sufficient to constitute an interference with property, the number of power line plaintiffs who may be able to recover will be limited to those landowners who experience actual physical manifestations from nearby power lines.

A power line plaintiff's best option may be to invoke the "special and peculiar damages" doctrine enunciated in the Supreme Court's Richards decision. In Richards, the Court placed great emphasis on distinguishing the plaintiff's "special and peculiar" damages from those disturbances incidental to all members of the general public living along a railroad track. Courts applying the Richards doctrine to power line plaintiffs probably would characterize residents along the right-of-ways of power lines as members of the general public. In other words, EMF exposure of property along a right-of-way is a disturbance incidental to all landowners along that right-of-way. Moreover, these courts will likely see the public benefit of electricity as more important than any inconsequential damages associated with power lines.

Nonetheless, plaintiffs along a right-of-way may be able to use the Richards doctrine if they can establish that their damages are unique or at least significantly different when compared to the damages of the other landowners along the right-of-way. Landowners who live next to a substation, for example, are exposed to significantly higher-level EMFs than those residing at other locations along the right-of-way. These plaintiffs may be able to show that the substation is the source of noise and their resulting headaches or nausea and thus have a better chance of demonstrating "special and peculiar" damages under the Richards doctrine. To prove such damages, power line plaintiffs should take measurements of the EMFs surrounding and within their property and then compare those readings to the levels that the general public along the power line right-of-way must endure.

Experts consider the normal level of magnetic fields within a home to range between 1 or 2 mG during any given day. If landowners can show that the magnetic fields in their home or on their property are at levels significantly above 1 to 2 mG, it may be sufficient to convince a jury that there has been a taking of their property. For

---

263 Id.
264 Richards, 233 U.S. at 557.
266 States that have constitutional clauses allowing recovery for damage to property as well as for taking of property may provide an easier route for a power line plaintiff employing
example, the landowners suing the San Diego Gas & Electric Company allegedly have compiled data showing that EMF levels in their home range from 3.5 to 17 mG. Because these field levels are so high, the fear to which these particular landowners constantly are subjected to is a "special and peculiar" burden on their use and enjoyment of their property—a taking for which they should claim compensation. Plaintiffs who experience electric shocks while in their back yards would have an even stronger case for proving a special and peculiar burden. Importantly, compensation based on this reasoning would assure recovery to only those plaintiffs with serious EMF exposure.

Like the aircraft taking by nuisance cases such as Thornburg, however, Richards requires evidence that a governmental entity created disturbing physical manifestations. Again, EMF's alone do not rise to the same level of disturbance as the dense black smoke, dirt, cinders, gases, and vibrations that existed in Richards. Although fear of EMF exposure and the resulting depreciation in property values are necessary elements for recovery under a theory using the Richards rationale, they are not sufficient bases of recovery in and of themselves. As a result, the most promising power line plaintiff employing the Richards analogy will be the landowner who lives not only next to a power line right-of-way but also close to a substation. If this landowner experiences additional physical manifestations from the power lines or the substation itself, the amount of additional disturbances may be sufficient for recovery under Richards.

Richards. There are presently situations where magnetic field levels do exceed even 100mG in homes next to 500-kV power lines. See BIOLOGICAL EFFECTS, supra note 6, at 22 fig. 2-11. See Power-Line Radiation Fights Head to Court, NAT'L J., Aug. 17, 1991, at 2030. For example, a resident of South Dakota who lives near a power transformer and four utility lines has stated that "you can hold a lightbulb in your hand and it will light up anywhere in the house." See High-Voltage Debate, NAT'L J., Aug. 17, 1991, at 2027.

Many of the reported cases where property owners are diagnosed with cancer allegedly caused by their proximity to power lines also live next to substations as well. See Cancer Cluster EMFs: A True Link or an Epidemiologist's Nightmare?, MICROWAVE NEWS, Sept.-Oct. 1990, at 8-9. Additional physical manifestations, such as headaches caused by loud buzzing from a nearby substation, or radio and television interference, may strengthen a power line plaintiff's chances of recovery under this theory—these are examples of actual physical interference with the use and enjoyment of property. The elements of fear and decrease in property value, however, will still probably need to be present.
The direction of power line litigation undoubtedly will follow the direction of power line research. Unfortunately, the United States government has taken only a limited role in EMF research. Since the government cut funds for EMF research in 1986, not more than a handful of private companies has taken over the task. In order to determine the health effects of EMFs, the government must take a more active role. A unified national research effort should be not only a governmental responsibility but a governmental priority. A bill in Congress during the 1991 session proposed to allocate $34 million over five years to the United States Environmental Protection Agency for EMF research. Constituents should pressure their representatives to support future bills like this one. If there is a causal connection between EMFs and cancer, the sooner it is proven, the sooner appropriate steps can be taken to minimize exposure.

Research on the effects of EMFs, however, should not focus solely on fields emanating from high-voltage power lines. If studies find that adverse health effects result from EMF exposure, then fields associated with distribution lines, building wiring, and appliances most likely will have the largest impact on public health. As a result, it is important that legislators, regulators, and researchers consider the potential dangers of EMF exposure to be a general problem rather than one exclusively related to high-tension power lines.

While scientists perform their research, it is also imperative that accurate public information be available. Many press accounts of EMF exposure tend to be simplistic, inflammatory, and at times inaccurate. Further, the utilities are the ones who are producing much of the public information on power lines. In order to ensure the highest levels of public confidence, neutral governmental sources

---

273 H.R. 1483, 102d Cong., 1st Sess. (1991). This bill would require the Secretary of Energy, in connection with the EPA, to develop and implement a comprehensive study of the potential human health effects of electric and magnetic fields. See id. The bill also would require the Secretary to evaluate whether improved engineering designs of electricity delivery systems to residences and work places would reduce the health risks that EMFs may pose, and to establish a public information program on issues related to electric and magnetic fields. See id.

274 See BIOLOGICAL EFFECTS, supra note 6, at 75.

275 See id.

276 Id. at 77.

277 Id.
should gather and supply information. Due to the amount of attention the media has given the issue, it is important that the public receive accurate, clear, and balanced information so that people do not make ill-advised decisions.

As a general policy, the implementation of such a research and dissemination effort on the effects of EMFs is not a goal with which many people will disagree. The more difficult issues are what type of research scientists should perform and what policy alternatives the general public should follow during this research. Many states have decided to promulgate regulations, hoping that these will help to reduce their citizens’ exposure levels. For example, seven states have issued standards for electric field emissions at the edge of power line right-of-ways. In fact, Florida has set the nation’s first magnetic field standard.

States can minimize the EMF exposure levels to their citizens by requiring certain safety distances between power lines and nearby residences or schools. Because the strengths of EMFs decrease rapidly with increased distance from their source, moving power lines could decrease significantly the exposure levels of many residents. Utilities also can reduce EMF strength by burying lines underground or encasing them in material that lowers the strengths of their fields. The problem with all of these proposals, however, is that EMF research has not established a dose-response relationship between the amount of exposure and human health effects. Thus, such safety measures could prove extremely expensive but not result in any positive benefits. Furthermore, given the available scientific knowledge, a regulatory approach that sets “safe” field strength limits is highly unsupportable on risk management grounds. It is not clear whether the assumption “more is worse” applies to power line fields.

Another alternative is for the government to adopt a policy of “prudent avoidance” and conduct its research accordingly. This alternative recommends that society make only prudent investments

278 Id.
279 Id.
280 See, e.g., Swanson, supra note 3, at 10.
281 See BIOLOGICAL EFFECTS, supra note 6, at 73.
282 See id., at 8, 10.
283 See Brodeur, supra note 3, at 71–72.
284 Young, supra note 47, at 182.
285 BIOLOGICAL EFFECTS, supra note 6, at 74.
286 Id. at 75.
287 Id.
to keep people away from EMFs. Examples of prudent avoidance include routing new transmission lines so that their EMF's avoid humans, widening transmission line right-of-ways, developing methods that reduce distribution line fields, developing new approaches to wiring buildings so as to minimize associated fields, and redesigning appliances to minimize or eliminate fields. The cost of researching and implementing such measures, however, may be prohibitive. In addition, many scientists feel that "prudent avoidance" policies are premature, and favor instead making biological research of possible EMF health effects the first item on any governmental agenda. Nonetheless, given the inconclusiveness of the current scientific data, if a state's option is between inactivity, aggressive regulation, and prudent avoidance, the latter is probably the best approach.

VIII. CONCLUSION

Plaintiffs who believe that EMF exposure has affected their health face an uphill battle. Because research to date has not proven conclusively that EMFs have any medical effects on humans, recovering from a power company for alleged EMF exposure will be extremely difficult if a suit is based solely on tort principles. In fact, with the possible exception of a common law trespass or nuisance claim, any attempt to recover by means of a personal injury claim will be nearly futile until scientists establish a causal connection between EMF exposure and cancer.

In the interim, while power line plaintiffs await the results of further scientific evidence, those whose property values are plummeting should consider bringing inverse condemnation suits against power companies. In so doing, a plaintiff may claim that a power company has taken from it an airspace easement for which compensation is due. The challenge of this approach involves proving that there has been an actionable physical invasion. This may be difficult for a judge to accept, because it is hard to conceptualize a physical invasion by something that people cannot see. Nonetheless, comparing EMF exposure cases to other situations in which courts have

---

288 Id. at 77.
290 Id.
291 See Young, supra note 47, at 185.
292 See supra text accompanying notes 79-94.
293 See supra text accompanying notes 223-49.
recognized physical invasions, such as those cases involving invisible fluoride compounds, may provide a judge with a more favorable idea of what may constitute a physical invasion.

Power line plaintiffs also may try to show that their situation does not involve the physical taking of an airspace easement but rather constitutes a taking by nuisance.\textsuperscript{294} Showing an interference—through fear and apprehension—with the use and enjoyment of property is essential for such a claim. Power line plaintiffs must, however, substantiate this fear by presenting actual measurements of EMF exposure levels and evidence of nuisance-type damages. In addition, they must prove that this fear adversely affects the market value of their property.

Similarly, power line plaintiffs may consider claiming that their property is being subjected to "special and peculiar" damages.\textsuperscript{295} Plaintiffs should measure the actual EMF levels in and around their homes and try to distinguish their exposure levels from those levels affecting other property owners along their right-of-way. The plaintiff with the greatest chance of success under this theory will be the landowner who lives near a power substation. Property owners living near substations are exposed to higher-level EMFs and are more likely to experience additional types of physical disturbances such as electric shocks and noise.

Evidence of possible health effects from EMFs is increasing with each passing year. There is already substantial evidence demonstrating that EMFs have some biological effects upon cellular functions, and other studies suggest possible links to cancer. While these studies are inconclusive, they nonetheless demonstrate how potentially catastrophic the EMF issue could become. Immediate calls for regulating exposure levels are premature. If there is going to be any progress in discovering whether EMFs are a human health hazard, however, the federal government is going to have to implement a large-scale, broadly based research effort. In the meantime, members of the legal community representing aggrieved landowners have two options—they can continue to sit patiently, awaiting the scientific evidence that presumably will open the floodgates to the common law world of torts, or they can act now, claiming that power companies have inversely condemned their clients' property. For those seeking immediate gratification, taking the road less traveled is probably the most promising route.

\textsuperscript{294} See supra text accompanying notes 205–61.

\textsuperscript{295} See supra text accompanying notes 262–72.