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Hog Farms and Nuisance Law in *Parker v. Barefoot*: Has North Carolina Become a Hog Heaven and Waste Lagoon?

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Hog Farms and Nuisance Law in *Parker v. Barefoot*: Has North Carolina Become a Hog Heaven and Waste Lagoon?

Traditionally, North Carolina farmers raised hogs as part of larger, independently owned and operated family farms, where the pigs served not only as a source of fertilizer, but as a source of food and as a trading commodity.[1] That tradition has eroded in recent years as corporate-run hog facilities have forced many independent hog farms out of business.[2] The dramatic decline in independent hog farms, however, has not prevented the hog industry from flourishing in North Carolina.[3] The success of the industry stems from the

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1. *See* JIM MASON & PETER SINGER, ANIMAL FACTORIES: WHAT AGRIBUSINESS IS DOING TO THE FAMILY FARM, THE ENVIRONMENT AND YOUR HEALTH 149 (2d ed. 1990); SWINE ODOR TASK FORCE, NORTH CAROLINA GENERAL ASSEMBLY, MARCH 1, 1995 REPORT: OPTIONS FOR MANAGING ODOR 12 (1995) [hereinafter TASK FORCE].

2. There is a direct correlation between the rapid decline of independent hog farms and the vertical integration of the pork industry. *See* Ken Silverstein, *Meat Factories*, SIERRA, Jan./Feb. 1999, at 28, 31. Vertical integration has occurred as large corporate hog producers have gained "control [over] every phase of [hog] production," from supplying feed, to managing production facilities, through processing, and finally to wholesale distribution. *Id.* at 31. Hog farmers contract with these large corporations, agreeing to raise the hogs, provide the land, build the hog houses and waste lagoons, and assume the risks associated with raising the hogs, including liability for nuisance claims. *See* TASK FORCE, *supra* note 1, at 9; John T. Holleman, *In Arkansas Which Comes First, the Chicken or the Environment?*, 6 TUL. ENVTL. L.J. 21, 25 (1992) (analogizing vertical integration to "franchisor-franchisee relationship"); Silverstein, *supra*, at 31. In turn, the corporations supply the hogs, feed, and medicine, and eventually take the hogs to the slaughterhouses. *See* Holleman, *supra*, at 25. Poultry magnate Frank Perdue pioneered vertical integration in the livestock industry; hog producers followed his lead. *See* Silverstein, *supra*, at 31. Today, North Carolina "leads the country in the movement towards concentration and vertical coordination of the entire [hog] industry." Raymond B. Palmquist et al., *Hog Operations, Environmental Effects, and Residential Property Values*, 73 LAND ECON. 114, 114 (1997).

Since vertical integration first began in 1983, the number of hog farms in the United States has decreased nearly 75%, from 600,000 to 157,000 in 1998. *See* Silverstein, *supra*, at 28, 31. In North Carolina, the rate of decline mirrors the national trend. In 1983, two million hogs were raised on over 23,000 farms, but by 1998, less than 6000 farms produced more than 10 million hogs. *See* Dennis Rogers, *The Gospel According to Boss Hog*, NEWS & OBSERVER (Raleigh, N.C.), Nov. 7, 1998, at 1B. On average, the establishment of one new corporate hog facility forces 10 independent or family operated farms out of business. *See id.* This decline occurs because vertical integration causes the price of pork to fall by significantly increasing the supply of hogs without a corresponding increase in demand. This in turn forces less efficient farms out of business. *See* Silverstein, *supra*, at 32 (noting that vertical integration has forced hog prices to plunge to their lowest point in 25 years, providing less than half of what independent hog farmers need to break even).

3. Hog farming is now the leading agribusiness in North Carolina, surpassing even

industrialization of hog farming operations, which has created massive, high-tech farm facilities throughout eastern North Carolina. The state encouraged this expansion by using various incentives to attract corporate hog producers beginning in 1979 and continuing through most of the 1980s.[4]

Unfortunately, North Carolina's regulatory structure was ill-equipped to handle the rapid growth of the hog industry and the adverse environmental impacts associated with that growth.[5] The state legislature only began to retreat from its support of the hog industry after a devastating hog waste spill occurred in June 1995,

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tobacco. *See* Joby Warrick & Pat Stith, *Corporate Takeovers*, NEWS & OBSERVER (Raleigh, N.C.), Feb. 21, 1995, at 1A. Moreover, North Carolina has become the second largest hog producer in the United States, raising more than 10 million hogs annually. *See Hog Farmers Liken Crisis to Depression*, GREENSBORO NEWS & REC. (N.C.), Jan. 10, 1999, at B8; Silverstein, *supra* note 2, at 33.

4. *See* Eric Voogt, *Pork, Pollution, and Pig Farming: The Truth About Corporate Hog Production in Kansas*, KAN. J.L. & PUB. POL'Y, Spring 1996, at 219, 228. Politicians who possessed a personal stake in the success of North Carolina's hog industry sponsored most of these incentives. During his 10 years as a North Carolina state legislator, Wendell Murphy, the largest hog producer in the United States, sponsored and supported a series of laws providing for various advantages to corporate hog producers. *See Murphy's Laws*, NEWS & OBSERVER (Raleigh, N.C.), Feb. 22, 1995, at 6A. For example, in 1985, North Carolina reduced the tax on gas used by feed delivery trucks by four cents per gallon. *See id.* A year later, construction materials related to hog farming were exempted from North Carolina's sales tax. *See id.* In 1988, the largest hog producers were exempted from a 12 cents per ton inspection fee on hog feed. *See id.* Also in 1988, the North Carolina legislature eliminated the tax on feed. *See id.* Finally, in 1991, the North Carolina legislature clarified an ambiguity in the state's right-to-farm statute by expressly defining the statutory term "bona fide farm" to include hog farming, thereby effectively prohibiting counties from using their zoning authority to regulate hog farms. *See id.*

Wendell Murphy is not the only North Carolina politician with personal ties to the hog industry. Former United States Senator Lauch Faircloth is a major stockholder in Lundy Packing, a hog processor in Clinton, North Carolina. *See* Silverstein, *supra* note 2, at 32-33. He owns a total of $19 million in numerous hog operations and his campaign donors included the North Carolina Pork Producers Association, the American Meat Institute, the National Pork Producers Association, and corporate hog producers, such as ConAgra, Carroll's Foods, and Lundy Packing. *See id.*

5. *See generally* TASK FORCE, *supra* note 1, at 5 (noting that "[n]o industry [in North Carolina] had ever grown so large so fast" as the hog industry, which doubled in only four years). The rapid increase in hog production and the greater density of industrialized hog operations have produced large amounts of waste and dead animals in a relatively small area, thereby increasing the strain on the environment in eastern North Carolina counties where most large hog operations are located. *See id.* at 7-13. By 1993, North Carolina's 10 million hogs produced 9 million tons of fresh manure. *See id.* at 13. Despite the problems involved in managing so much waste, North Carolina's right-to-farm statute has prevented counties from taking steps to address related environmental and health issues. *See* N.C. GEN. STAT. § 106-701(d) (1995); *see also* Charles W. Abdalla & John C. Becker, *Jurisdictional Boundaries: Who Should Make the Rules of the Regulatory Game?*, 3 DRAKE J. AGRIC. L. 7, 25 (1998) (discussing the effect of North Carolina's right-to-farm statute); *infra* notes 84-94 (same).

when an eight-acre manure lagoon at Oceanview Farms in Onslow County broke through its dam and spilled more than twenty-five million gallons of hog manure into the New River.[6] Following that spill, the North Carolina General Assembly passed legislation allowing counties to use their zoning authority to regulate hog farms,[7] while also establishing a temporary moratorium on the construction or expansion of hog farms, waste lagoons, and animal waste management systems so that counties could develop and implement the new regulations.[8] Despite these recent efforts, however, odor and other effects of corporate hog farming remain contentious issues between corporate hog facilities and neighboring landowners, as illustrated by the recent case *Parker v. Barefoot*.[9]

In *Parker v. Barefoot*, the North Carolina Court of Appeals reviewed a nuisance claim brought by several neighbors of a hog farm operated by Terry and Rita Barefoot. The issue on appeal was whether the trial court had committed a reversible error by refusing the plaintiffs' request to instruct the jury that the law does not recognize the use of the state-of-the-art technology[10] as a defense to a nuisance claim.[11] The court of appeals held for the plaintiff-appellants and granted a retrial.[12] *Barefoot* is noteworthy in two respects. First, it is the first hog farming case to reach the appellate court since the vertical integration of North Carolina's hog industry that deals with the issue of whether hog odors constitute a nuisance.[13]

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6. *See* John D. Burns, Comment, *The Eight Million Little Pigs—A Cautionary Tale: Statutory and Regulatory Responses to Concentrated Hog Farming*, 31 WAKE FOREST L. REV. 851, 851 (1996).

7. *See* Act of Aug. 26, 1997, ch. 458, sec. 2.1, 1997 N.C. Sess. Laws 1938 (codified at N.C. GEN. STAT. § 153A-340(b)(3) (Supp. 1998)); *infra* notes 93-94 and accompanying text (discussing passage of the statute).

8. *See* Act of Aug. 26, 1997, ch. 458, sec. 1.1, 1997 N.C. Sess. Laws 1938, *as amended* by Act of Oct. 16, 1998, ch. 188, sec. 2, 1998 N.C. Adv. Legis. Serv. 72 (extending temporary moratorium until September 1, 1999).

9. 130 N.C. App. 18, 502 S.E.2d 42, *disc. rev. denied*, 349 N.C. 362 (1998).

10. The term "state-of-the-art" was used synonymously with the term "best available technology" in *Barefoot*. 130 N.C. App. at 23, 502 S.E.2d at 46. The terms are used interchangeably throughout this Note.

11. *See id.* at 18-19, 502 S.E.2d at 44.

12. *See id.* at 26, 502 S.E.2d at 48.

13. Prior to *Barefoot*, only two cases involving hog farms had reached the appellate level. *See* Durham v. Britt, 117 N.C. App. 250, 254-55, 451 S.E.2d. 1, 3-4 (1994) (addressing whether a farm that was converted from turkey production to hog production remains shielded from nuisance suits under North Carolina's right-to-farm statute); Mayes v. Tabor, 77 N.C. App. 197, 200-01, 334 S.E.2d 489, 490-91 (1985) (recognizing that the type of unreasonableness that must be shown to prove that hog farm odors are a nuisance varies with the remedy sought). Although *Mayes* was decided in 1985, the factual dispute was based on events in the early 1980s before the vertical integration of North Carolina's

Second, it confirms the potential liability of hog facilities even if they conform with applicable regulations and use the best available technology for odor control and waste management.[14]

This Note begins with a synopsis of the North Carolina Court of Appeals decision in *Barefoot*.[15] The Note then discusses nuisance law in North Carolina and pertinent state legislation.[16] Next, the Note briefly discusses the state-of-the-art defense.[17] After examining the state of the hog industry and its waste problems in North Carolina,[18] the Note considers the design of the Barefoots' farm and the current state of the art for hog operations.[19] Finally, the Note examines the propriety of the decision in *Barefoot* and the case's probable impact on future nuisance claims against hog farms.[20]

In 1991, Terry and Rita Barefoot constructed a ninety-five acre industrial hog farm.[21] The facility, designed by the U.S. Soil Conservation Service,[22] consisted of four hog houses used to raise approximately 2880 hogs.[23] As part of the facility, the defendants constructed an open-pit anaerobic lagoon to store hog waste for later use as fertilizer.[24] After the farm began operations, twenty-seven

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hog industry. 77 N.C. App. at 198, 334 S.E.2d at 490; *see also supra* note 2 (discussing vertical integration).

14. *See Barefoot*, 130 N.C. App. at 26, 502 S.E.2d at 48.

15. *See infra* notes 21-45 and accompanying text.

16. *See infra* notes 46-103 and accompanying text.

17. *See infra* notes 104-20 and accompanying text.

18. *See infra* notes 121-34 and accompanying text.

19. *See infra* notes 135-45 and accompanying text.

20. *See infra* notes 146-58 and accompanying text.

21. *See Barefoot*, 130 N.C. App. at 19, 502 S.E.2d at 44.

22. The Soil Conservation Service administers several federal programs relating to the use, protection, and development of land, including research and technical assistance to farmers and community conservation, land-use planning, and watershed management control groups. *See* 7 C.F.R. § 15b, app. A (1999) (listing the programs and activities administered by the Soil Conservation Service).

23. *See Barefoot*, 130 N.C. App. at 19, 502 S.E.2d at 44.

24. *See id.* The construction or operation of an animal waste management system requires the operator to obtain a permit from the North Carolina Environmental Management Commission if the "animal operation" has 250 or more hogs. *See* N.C. GEN. STAT. §§ 143-215.1(a)(12), -215.10B(1) (1999). An "[a]nimal waste management system" is defined as "a combination of structures and nonstructural practices serving a feedlot that provide for the collection, treatment, storage, or land application of animal waste." *Id.* § 143-215.10B(3). When applying for a permit, the operator must submit a plan discussing the animal waste management practices or combination of practices that will be implemented for the specific feedlot. *See id.* § 143-215.10C(d). These practices must meet either the minimum standards and specifications contained in the U.S. Department of Agriculture Soil Conservation Service's Field Office Technical Guide or the minimum standard of practices developed by the state Soil and Water Conservation Commission before a permit can be issued. *See* N.C. ADMIN. CODE tit. 15A, r. 2H.0217(a)(1)(H)(i) (June 1998).

neighbors sued the Barefoots in Johnston County Superior Court, claiming that the odor from the hog farm constituted a nuisance.[25] At trial, the plaintiffs claimed that the odor from the open-pit lagoon was so strong that it burned their eyes and noses, often significantly impairing their vision and respiration.[26] In response, the defendants argued that occasional odors from their farm did not amount to a nuisance,[27] and presented evidence at trial that their hog facility was " 'operated with the most careful, prudent and modern methods known to science.' "[28] After the presentation of evidence, the plaintiffs asked the trial judge to instruct the jury that North Carolina law does not recognize the state-of-the-art technology defense in a nuisance suit.[29] The judge denied the plaintiffs' request, and the jury found for the defendants.[30] The plaintiffs appealed, arguing that the judge's ruling was reversible error.[31]

The North Carolina Court of Appeals accepted the plaintiff-appellants' argument and remanded the case for a new trial.[32] In an opinion written by Judge Wynn, the court reiterated the well-established rule that neither the use of state-of-the-art technology in the operation of a facility nor the absence of negligence in a facility's

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25. *See Barefoot*, 130 N.C. App. at 18-19, 502 S.E.2d at 43-44.

26. *See id.* at 19, 502 S.E.2d at 44.

27. *See id.* The defendants also argued that the plaintiffs' claim was barred by North Carolina's right-to-farm statute, *see* Defendants' Answer and Motions to Dismiss at 1-2, Parker v. Barefoot (No. 92 CVS 02092), but that argument was rejected by the trial court at the summary judgment phase. *See* Parker v. Barefoot, No. 92 CVS 02092 (Johnston County May 31, 1994) (order denying summary judgment). Because the issue was not addressed in the trial court record or the appeals court decision, this Note does not discuss it further. For a general discussion of North Carolina's right-to-farm statute, see *supra* notes 84-94 and accompanying text.

28. *Barefoot*, 130 N.C. App. at 19, 502 S.E.2d at 44 (quoting Defendants' Answer & Motions to Dismiss at 5, *Barefoot* (No. 92 CVS 02092)).

29. *See id.* The plaintiffs requested the following jury instruction:

> The law does not recognize as a defense to a claim of nuisance that defendants used the best technical knowledge available at the time to avoid or alleviate the nuisance, and therefore the defendants may be held liable for creating a nuisance even though they used the latest known technical devices in their attempts to control the condition. The use of technical equipment and control devices may be considered by you as evidence bearing upon the magnitude of a nuisance but not as to its existence. Indeed, if defendants created a nuisance they are liable for the resulting injuries, regardless of the degree of skill they used to avoid or alleviate the nuisance.

Id. at 20-21, 502 S.E.2d at 45.

30. *See id.* at 19-20, 502 S.E.2d at 44.

31. *See id.* at 20, 502 S.E.2d at 44.

32. *See id.* at 18-19, 26, 502 S.E.2d at 44, 48. The decision was 2-1, with Judge Martin dissenting. *See id.* at 26-27, 502 S.E.2d at 48 (Martin, J., dissenting).

design is an absolute defense to a nuisance claim.[33] Therefore, because the plaintiffs' proposed instruction correctly summarized North Carolina's nuisance law, the appeals court held that the trial judge's failure to provide the substance of the plaintiffs' instruction was reversible error.[34]

On appeal, the neighbors argued that the Barefoots' main defense at trial had been that they could not be held liable under the law because their hog facility was " 'state-of-the-art' " and " 'operated with the most careful, prudent and modern methods known to science.' "[35] The Barefoots disputed this claim, stating that they had submitted the descriptions only to rebut the neighbors' allegation that the hog farm was a " 'shoddy, second-rate affair.' "[36] Instead, the Barefoots contended that the only defense they presented at trial was a factual one, specifically that their facility did not constitute a nuisance because it was reasonably designed and equipped with technology sufficient to alleviate odor.[37] Despite the Barefoots' contentions, the appellate court held that their testimony and argument at trial "could have reasonably been viewed by the jury as an affirmative attempt . . . to make out a 'state-of-the-art' defense."[38] Consequently, the appeals court determined that the evidence in the case required that the trial judge present the substance of the neighbors' requested instruction.[39]

The court concluded that the trial court's instruction did not clearly inform the jury that the Barefoots still could be found liable under North Carolina nuisance law if they substantially and unreasonably interfered with the neighbors' use of their property, regardless of whether the farm used state-of-the-art technology.[40] The court emphasized that the presentation of state-of-the-art evidence at trial was likely to confuse a jury about a defendant's

33. *See id.* at 21, 502 S.E.2d at 45; *see also* Watts v. Pama Mfg. Co., 256 N.C. 611, 616, 124 S.E.2d 809, 813 (1962) (holding that "[a] person who intentionally creates or maintains a private nuisance is liable for the resulting injury to others regardless of the degree of care or skill exercised by him to avoid such injury"); Morgan v. High Penn Oil Co., 238 N.C. 185, 194, 77 S.E.2d 682, 689 (1953) (same). For a discussion of the state-of-the-art defense, see *infra* notes 104-20 and accompanying text.

34. *See Barefoot*, 130 N.C. App. at 23, 502 S.E.2d at 46.

35. *Id.* (quoting Defendants' Answer & Motions to Dismiss at 3, 5, *Barefoot* (No. 92 CVS 02092)).

36. *Id.* (quoting Brief of Defendants-Appellees at 33, Parker v. Barefoot, 130 N.C. App. 18, 502 S.E.2d 42 (1998) (No. COA97-713)).

37. *See id.*

38. *Id.*

39. *See id.* at 24, 502 S.E.2d at 47.

40. *See id.* at 26, 502 S.E.2d at 48.

potential liability unless the trial judge specifically instructed the jury about the limited weight of such evidence.[41] The *Barefoot* court ruled that the trial judge's refusal to give this type of instruction constituted reversible error and granted the neighbors a new trial.[42]

Judge Martin dissented from the decision, although he agreed with the majority's articulation of North Carolina's nuisance law.[43] The primary difference between the majority and the dissent revolved around the interpretation of the Barefoots' statements and arguments regarding the construction and operation of their hog farm. Judge Martin believed that the discussion of the farm's design was only a minor part of the case.[44] He concluded that the neighbors' proposed instruction was not justified by the evidence and that they had failed to prove that they were prejudiced by the trial judge's ruling.[45]

The central issue in *Barefoot* was whether the farmers' use of their property amounted to a nuisance. Nuisance law attempts to balance two competing interests: the right of one individual to put his land to productive use[46] and the right of nearby property owners to be free from physical invasions that substantially interfere with the use

41. *See id.*

42. *See id.*

43. *See id.* at 26-27, 502 S.E.2d at 48 (Martin, J., dissenting).

44. *See id.* (Martin, J., dissenting) (accepting the Barefoots' factual characterization of the evidence). Judge Martin perceived the Barefoots' brief testimony regarding the general design of the facility as a mere rebuttal to the neighbors' denigrating characterizations of the farm. *See id.* (Martin, J., dissenting). He argued that what the majority interpreted as a state-of-the-art defense actually was "an insignificant aspect of the case." *Id.* (Martin, J., dissenting). Since the neighbors' charge contained issues irrelevant to the case, Judge Martin believed that the trial judge acted within his discretion when he denied the request for special instructions. *See id.* at 27, 502 S.E.2d at 48 (Martin, J., dissenting) (citing State v. Agnew, 294 N.C. 382, 395, 241 S.E.2d 684, 692 (1978)).

45. *See id.* at 26-27, 502 S.E.2d at 48 (Martin, J., dissenting). Judge Martin relied on the notion that a jury instruction will be upheld as long as " 'it presents the law of the case in such manner as to leave no reasonable cause to believe the jury was misled or misinformed.' " *Id.* at 27, 502 S.E.2d at 49 (Martin, J., dissenting) (quoting Jones v. Satterfield Dev. Co., 16 N.C. App. 80, 86-87, 191 S.E.2d 435, 440 (1972)). He argued that the appellant has the burden of showing that the instruction given by the trial judge misled the jury or that the omitted instruction affected the jury's verdict. *See id.* (Martin, J., dissenting) (citing Robinson v. Seaboard Sys. R.R., 87 N.C. App. 512, 524, 361 S.E.2d 909, 917 (1987)). According to Judge Martin, the trial court's instruction adequately depicted the law of the case, and the majority's conclusion that the jury was misled, misinformed, or otherwise confused by the trial court's refusal to provide the proposed instruction was pure speculation. *See id.* (Martin, J., dissenting).

46. The landowner's right to put land to productive use is one of the bundle of rights associated with property ownership. *See generally* Lucas v. South Carolina Coastal Council, 505 U.S. 1003, 1027-28 (1992) (recognizing that states have a limited ability to restrict the "bundle of rights" that landowners acquire concomitant with property ownership and that a state may not completely restrict a landowner's productive use of her land without just compensation).

and enjoyment of their property.[47] Consequently, the precise boundaries of an individual's " 'right to do as he pleases with his own property are difficult to define.' "[48] Nuisance law requires that the particular use be reasonable under the circumstances.[49] Ultimately, the reasonableness of a property owner's conduct is determined by the factfinder.[50]

The seminal case of *Morgan v. High Penn Oil Co.*[51] established the fundamental elements of nuisance. The Morgan family purchased property in 1945 in Guilford County, North Carolina, and built their home, a restaurant, and mobile home hook-ups on the site.[52] Five years later, High Penn Oil built an oil refinery nearby.[53] Once completed, the refinery remained in constant operation, emitting noxious fumes and gases.[54] The issue in *Morgan* was whether these emissions constituted a nuisance even though High Penn had used all available methods to reduce the fumes and gases.[55]

In addressing that issue, the North Carolina Supreme Court recognized the basic principle that "any substantial nontrespassory invasion of another's interest in the private use and enjoyment of land ... is a private nuisance."[56] The court held that a person could be liable for a private nuisance regardless of whether the invasion was intentional or unintentional.[57] The court defined both terms, stating

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47. *See* Watts v. Pama Mfg. Co., 256 N.C. 611, 616, 124 S.E.2d 809, 813 (1962); Morgan v. High Penn Oil Co., 238 N.C. 185, 193, 77 S.E.2d 682, 689 (1953); *see also* Louise A. Halper, *Untangling the Nuisance Knot*, 26 B.C. ENVTL. AFF. L. REV. 89, 101-02 (1998) (discussing the use of the common law doctrine of nuisance "as an all-purpose tool of land use regulation" and dispute resolution); Alexander A. Reinert, Note, *The Right to Farm: Hog-Tied and Nuisance-Bound*, 73 N.Y.U. L. REV. 1694, 1699-1703 (1998) (discussing the use of nuisance law to settle land-use disputes between hog farmers and their neighbors).

48. *Watts*, 256 N.C. at 617, 124 S.E.2d at 814 (quoting 39 AM. JUR. *Nuisances* § 16 (1942)).

49. *See id.* at 618, 124 S.E.2d at 814.

50. *See id.*

51. 238 N.C. 185, 77 S.E.2d 682 (1953).

52. *See id.* at 186-87, 77 S.E.2d at 684.

53. *See id.* at 186-87, 77 S.E.2d at 684-85.

54. *See id.* at 187-88, 77 S.E.2d at 685.

55. *See id.* at 190, 77 S.E.2d at 687.

56. *Id.* at 193, 77 S.E.2d at 689. The court noted that private nuisances could be classified into two distinct categories: (1) nuisances per se, or at law, and (2) nuisances per accidens, or in fact. *See id.* at 191, 77 S.E.2d at 687. The court defined the former as "an act, occupation, or structure which is a nuisance at all times and under any circumstance, regardless of location or surroundings." *Id.* By contrast, the latter only becomes a nuisance "by reason of [its] location, or by reason of the manner in which [it is] constructed, maintained, or operated." *Id.* A lawful enterprise that is neither constructed nor operated in a negligent manner, however, may still constitute a nuisance per accidens. *See id.* at 191, 77 S.E.2d at 687-88.

57. *See id.* at 193, 77 S.E.2d at 689. The court recognized that private nuisances per

that an unintentional nuisance stems from conduct that "is negligent, reckless, or ultrahazardous," while an intentional nuisance results from conduct that is deliberate and "unreasonable under the circumstances."[58] The court explained that unreasonable conduct occurs when a person: (1) purposefully causes the nuisance; (2) knows the nuisance will result; or (3) knows with substantial certainty that a nuisance will result.[59] Therefore, the court held, someone who "intentionally creates or maintains a private nuisance is liable for the resulting injury to others regardless of the degree of care or skill exercised by him to avoid such injury" because such conduct is manifestly unreasonable.[60] Under these principles, the court held that there had been ample evidence presented at trial to establish that the constant emission of fumes and gases onto the Morgans' property significantly impaired their use and enjoyment of the land so as to constitute a nuisance.[61]

Watts v. Pama Manufacturing Co.[62] built on the foundation of *Morgan*. In *Watts*, the plaintiff-appellees purchased a home in Gaston County, North Carolina, in 1957.[63] The property was located close to a hosiery manufacturer.[64] Two years later, the Pama Manufacturing Company took control of the hosiery factory and converted it to manufacture raw textiles.[65] As part of the conversion, the company replaced the original equipment with heavier and larger machinery and installed an additional industrial air-conditioning unit.[66] The company operated this new equipment almost continuously.[67] The issue presented to the court in *Watts* was whether the operation of the industrial mill, which caused continuous vibration of the Watts' property, amounted to unreasonable conduct constituting a nuisance.[68] Relying on the principles enunciated in *Morgan*, the *Watts* court held that although the operation of a lawful enterprise does not constitute a private nuisance as a matter of law,

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accidens could result from either intentional or unintentional conduct, but that most "are intentionally created or maintained, and are redressed by the courts without allegation or proof of negligence." *Id.* at 191, 77 S.E.2d at 688.

58. *Id.* at 193, 77 S.E.2d at 689.
59. *See id.* at 194, 77 S.E.2d at 689.
60. *Id.*
61. *See id.* at 194-95, 77 S.E.2d at 690.
62. 256 N.C. 611, 124 S.E.2d 809 (1962).
63. *See id.* at 613, 124 S.E.2d at 810-11.
64. *See id.* at 613, 124 S.E.2d at 811.
65. *See id.*
66. *See id.*
67. *See id.* at 614, 124 S.E.2d at 811.
68. *See id.* at 615-16, 124 S.E.2d at 812.

noise and vibrations may constitute a private nuisance in fact.[69]

The court explained the general principles of nuisance law, stating that a "*substantial* non-trespassory invasion of another's interest in the private use and enjoyment of property" is a nuisance if it substantially " 'affect[s] the health, comfort or property of those who live near[by].' "[70] According to the court, a substantial invasion is one "that involves more than slight inconvenience or petty annoyance."[71] Nevertheless, the court cautioned that the intentional character of an invasion does not necessarily render the invasion unreasonable, explaining that "[w]hat is reasonable in one locality and in one set of circumstances may be unreasonable in another."[72] Therefore, the proper test is "whether reasonable persons generally, looking at the whole situation impartially and objectively, would consider [the defendant's conduct] unreasonable."[73] The court remanded the case with a list of several factors for the jury to consider in evaluating the reasonableness of a defendant's actions.[74]

The North Carolina Court of Appeals elaborated on the reasonableness test in a hog farming context in *Mayes v. Tabor*,[75] in which the owner of a summer camp brought a nuisance action seeking permanent injunctive relief against neighboring hog farmers.[76] The court of appeals noted that a conclusion that a hog farmer operated his farm without negligence in an agricultural area does not end the

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69. *See id.* at 617, 124 S.E.2d at 813.

70. *Id.* at 617, 124 S.E.2d at 813-14 (quoting Pake v. Morris, 230 N.C. 424, 426, 53 S.E.2d 300, 301 (1949), and citing Duffy v. E.H. & J.A. Meadows Co., 131 N.C. 31, 33-34, 42 S.E. 460, 461 (1902)).

71. *Id.* at 619, 124 S.E.2d at 815.

72. *Id.* at 618, 124 S.E.2d at 814.

73. *Id.*

74. *See id.* These factors include: the conditions and nature of the location and operation, the severity and nature of the invasion, the social values of each party's land-use, which party had earlier occupancy, "and other considerations arising upon the evidence." *Id.* The court noted that "[n]o single factor is decisive [but that] all the circumstances in the particular case must be considered." *Id.* Finally, the court emphasized that even if " 'a person voluntarily comes to a nuisance by moving into the sphere of its injurious effect, or by purchasing adjoining property or erecting a residence or building in the vicinity after the nuisance is created,' " a person can still recover damages for any injuries she sustains as a result of the nuisance. *Id.* at 618-19, 124 S.E.2d at 815 (quoting 39 AM. JUR. *Nuisances* § 197 (1942)). *See generally* Reinert, *supra* note 47, at 1700-01 (discussing the shift away from fault-based evaluations of nuisance claims and concomitant shift away from the rule that barred relief for plaintiffs moving to a nuisance).

75. 77 N.C. App. 197, 334 S.E.2d 489 (1985). This was the only nuisance case involving hog farms and focusing on the reasonableness of the defendant's conduct to reach the appellate level before *Barefoot*. Search of WESTLAW, NC-SC database (July 12, 1999) (using "hog farms" and "nuisance" as search terms).

76. *See Mayes*, 77 N.C. App. at 198, 334 S.E.2d at 489-90.

inquiry as to whether or not the operation of that hog farm constitutes a nuisance.[77] Instead, the type of unreasonableness must be assessed in order to determine the appropriate remedy for an intentional private nuisance.[78] The court of appeals explained that the type of unreasonableness determines whether a plaintiff can obtain damages, injunctive relief, or both.[79] According to the court, the "[u]nreasonable interference with another's use and enjoyment of land is grounds for damages."[80] Thus, in order to recover damages, "the defendant's conduct, in and of itself, need not be unreasonable" as long as the alleged nuisance unreasonably interferes with another's use and enjoyment of her land.[81] Injunctive relief, however, requires "proof that the defendant's conduct itself is unreasonable; [that] the gravity of the harm to the plaintiff . . . outweigh[s] the utility of the conduct of the defendant."[82] Because the trial court failed to apply the appropriate reasonableness standard, the court of appeals reversed and remanded the case so that the propriety of injunctive relief could be determined.[83]

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77. *See id.* at 200, 334 S.E.2d at 491.

78. *See id.* at 200, 334 S.E.2d at 490.

79. *See id.* at 200, 334 S.E.2d at 490-91.

80. *Id.* at 200, 334 S.E.2d at 490 (citing Kent v. Humphries, 303 N.C. 675, 677-78, 281 S.E.2d 43, 45 (1981); Pendergrast v. Aiken, 293 N.C. 201, 217-18, 236 S.E.2d 787, 797 (1977)).

81. *Id.* (citing W. PAGE KEETON ET AL., PROSSER & KEETON ON THE LAW OF TORTS § 87, at 623 (5th ed. 1984)).

82. *Id.* at 200, 334 S.E.2d at 490-91 (citing *Pendergrast*, 293 N.C. at 217-18, 236 S.E.2d at 797). According to the court, " '[r]easonableness is a question of fact to be determined in each case by weighing the gravity of the harm to the plaintiff against the utility of the conduct of the defendant.' " *Id.* at 200, 334 S.E.2d at 491 (quoting *Pendergrast*, 293 N.C. at 217, 236 S.E.2d at 797). In determining the gravity of the harm, the court must consider: (1) the extent and character of the harm to the plaintiff; (2) the social value that the law attaches to the type of use invaded; (3) the suitability of the locality for that use; (4) the burden on the plaintiff to minimize the harm; and (5) other relevant considerations arising from the evidence. *See id.* (quoting *Pendergrast*, 293 N.C. at 217, 236 S.E.2d at 797). Similarly, when determining the utility of defendants' conduct, the court must consider: (1) the purpose of the defendant's conduct; (2) the social value that the law attaches to that purpose; (3) the suitability of the locality for defendant's use; and (4) other relevant considerations pertinent to the evidence presented. *See id.* (quoting *Pendergrast*, 293 N.C. at 217, 236 S.E.2d at 797).

83. *See id.* at 200, 334 S.E.2d at 491. The defendants also contended that North Carolina's right-to-farm statute entitled them to summary judgment. *See id.* at 201, 334 S.E.2d at 491. The court of appeals disagreed, interpreting the statute as precluding nuisance suits in situations where land-use patterns change around existing farming operations. *See id.*; *see also infra* notes 84-94 and accompanying text (discussing North Carolina's right-to-farm statute in more detail). In *Mayes*, the court noted that the plaintiff summer camp had operated for nearly 60 years, while the hog farm had operated for just 15 years; thus, it was not a situation where non-agricultural activities had extended into an agricultural area. 77 N.C. App. at 198, 201, 334 S.E.2d at 489-90, 491.

Within this framework of general nuisance law, North Carolina's agricultural operations often receive special protection because the General Assembly has passed a right-to-farm statute that makes it harder to bring nuisance suits against farmers.[84] As the state court of appeals recognized in *Baucom's Nursery Co. v. Mecklenburg County*,[85] "[i]t is the public policy of North Carolina to encourage farming, farmers, and farmlands."[86] To this end, the right-to-farm law "limit[s] the circumstances under which an agricultural . . . operation may be deemed to be a nuisance."[87] Under the statute, a farm that has been in lawful operation for at least one year and that was not a nuisance when it commenced cannot become either a public or private nuisance "by any changed conditions in or about the locality thereof."[88] While external changes to the locality surrounding a hog farm fall within the purview of the statute, the North Carolina Court of Appeals has interpreted the law to exclude situations in which a farmer fundamentally alters the nature of her agricultural activity.[89] Thus, if a farming operation exists for more than one year and then significantly changes its form of agricultural use or its hours of operation, the statute does not provide blanket protection to the farm owner.[90] Instead, the new agricultural use or hours must exist for one year before coming within the scope of the right-to-farm law.[91]

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84. *See* N.C. GEN. STAT. §§106-700 to -701 (1995). Commentators have called North Carolina's law, which was enacted in 1979, "one of the earliest and most influential right to farm laws" in the United States. Margaret Rosso Grossman & Thomas G. Fischer, *Protecting the Right to Farm: Statutory Limits on Nuisance Actions Against the Farmer*, 1983 WIS. L. REV. 95, 119. At least 19 states modeled their right-to-farm statutes on North Carolina's law. *See id.*

85. 62 N.C. App. 396, 303 S.E.2d 236 (1983).

86. *Id.* at 398, 303 S.E.2d at 238.

87. N.C. GEN. STAT. § 106-700 (1995).

88. *Id.* § 106-701(a). Section 106-701(b) defines an "agricultural operation" as "any facility for the production for commercial purposes of . . . livestock . . . [or] livestock products." *Id.* Therefore, hog farms fall within the statutory protections against nuisance claims.

89. *See* Durham v. Britt, 117 N.C. App. 250, 254-55, 451 S.E.2d 1, 3 (1994); *cf.* Mayes v. Tabor, 77 N.C. App. 197, 201, 334 S.E.2d 489, 491 (1985) (observing that sections 106-700 and 106-701 of the North Carolina General Statutes apply only in situations where a non-agricultural use extends into an agricultural area, not where there is a pre-existing non-agricultural use situated in a particular locality prior to the initial operation of an agricultural facility). *Mayes* is discussed *supra* notes 75-83 and accompanying text.

90. *See Britt*, 117 N.C. App. at 255, 451 S.E.2d at 3. In *Britt*, the court held that the alteration of the agricultural facility from turkey to hog production constituted a fundamental change not protected by section 106-701. *See id.* at 255, 451 S.E.2d at 4. The court also held that defendant's compliance with federal law did not bar a nuisance claim where the federal law does not specifically preempt state law. *See id.*

91. *See* N.C. GEN. STAT. § 106-701(a).

The right-to-farm statute originally declared null and void any local ordinance that would make any farming activity or the operation of a farm a nuisance.[92] The scope of this restriction was limited in 1997, however, when the General Assembly passed a package of hog farm and clean water provisions in reaction to a major hog waste spill.[93] Under the 1997 amendments, section 153A-340 of the North Carolina General Statutes now authorizes counties to adopt zoning regulations for hog farms with a designed capacity of about 4000 hogs or more.[94] The relationship between North Carolina's right-to-farm statute and the 1997 provisions is not yet clear, but these zoning amendments are significant because for the first time since the adoption of the right-to-farm statute in 1979, counties have some ability to regulate industrial hog farms and to allow private nuisance suits against them.

A recent case from another major hog-producing state[95] suggests that North Carolina's right-to-farm statute could be further weakened by a constitutional challenge. In *Bormann v. Board of Supervisors*,[96] the plaintiff-appellants facially challenged Iowa's right-to-farm law,[97]

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92. *See id.* § 106-701(d).

93. *See* Act of Aug. 26, 1997, ch. 458, 1997 N.C. Sess. Laws 1938 (codified in scattered sections of North Carolina General Statutes Chapters 106, 143 and 153); *supra* notes 5-8 and accompanying text. The bill was enacted in response to the divisive environmental and nuisance issues caused by North Carolina's thriving hog industry. *See* Abdalla & Becker, *supra* note 5, at 25.

94. *See* N.C. GEN. STAT. § 153A-340(b)(3) (1997). Because hogs are considered ready for processing at the early age of six months, the amount of turnover in an industrialized facility is tremendous and causes continual fluctuation in the actual aggregate weight of the hogs at the site. Despite this constant change, the average weight of the hogs (whether calculated on a daily, weekly, or monthly basis) can be used to determine whether the facility is subject to section 153A-340 of the North Carolina General Statutes. If the average weight amounts to 600,000 pounds or more, then the facility does not receive the benefits of the right-to-farm statute. *See id.* § 153A-340. If, however, the average weight is less than 600,000 pounds and the facility has been in existence for one year or more, the facility is shielded from nuisance suits and zoning regulations. *See id.* § 106-701(a); § 153A-340. A farm with 600,000 liveweight capacity has room for about 4000 hogs. *See* Abdalla & Becher, *supra* note 5, at 25.

95. Iowa is the only state to produce more hogs than North Carolina. It raises more than 14.5 million hogs annually. *See* Silverstein, *supra* note 2, at 31.

96. 584 N.W.2d 309 (Iowa 1998), *cert. denied sub nom.* Girres v. Bormann, 119 S. Ct. 1096 (1999). *See generally* Mindy Larsen Poldberg, *A Practioner's Guide to Iowa Manure Laws, Manure Regulations, and Manure Application Agreements*, 3 DRAKE J. AGRIC. L. 433, 456-61 (1998) (discussing the Iowa Supreme Court's decision in *Bormann* and its potential effect on other statutes that provide nuisance protection to farmers).

97. *See* IOWA CODE ANN. § 352.11(1)(a) (West 1994) ("A farm or farm operation located in an agricultural area shall not be found to be a nuisance regardless of the established date of operation or expansion of the agricultural activities of the farm or farm operation."). An agricultural area was defined under the statute as an area designated by a county with the consent of the property owners where the use of the land was limited to

claiming not only that it constituted a per se taking of their property,[98] but also that the provision gave certain private property owners in designated agricultural areas legal permission to foist a nuisance onto neighboring property, thereby generating an easement.[99] The Iowa Supreme Court agreed, holding that the statutory immunity from nuisance claims allowed certain property owners to engage in conduct, which, absent the establishment of an easement, would constitute a nuisance.[100] Moreover, since easements are subject to the Takings Clause of the Fifth Amendment,[101] the court held that the State could not "regulate property so as to insulate the users from potential private nuisance claims without providing just compensation to persons injured by the nuisance."[102] The court concluded that the "legislature exceeded its authority by authorizing the use of property in such a way as to infringe on the rights of others by allowing the creation of a nuisance without the payment of just compensation" in violation of the Fifth Amendment.[103]

As the scope North Carolina's right-to-farm statute shrinks, hog farmers may turn instead to the state-of-the-art defense for protection from nuisance suits. The defense developed initially in products liability law, where courts felt it was unjust to hold manufacturers liable when older products did not live up to modern safety standards.[104] In products liability cases, the defense is used to assert that a manufacturer should not be liable when it uses state-of-the-art safety features in a product and instead should be liable only if it fails to warn consumers of an inherently dangerous product characteristic when the manufacturer had actual or constructive knowledge of the danger.[105] Most jurisdictions recognize this defense, but apply it in

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farming. *See id.* § 352.6. The statute delineated several exceptions to the prohibition against nuisance claims; a plaintiff could bring a nuisance suit if the defendant's farming operation was (1) unlawful; (2) negligent; (3) a nuisance prior to the agricultural area designation; or (4) caused a "change in condition of the waters of a stream, the overflowing of the person's land, or excessive soil erosion." *Id.* § 352.11(1)(b).

98. *See Bormann*, 584 N.W.2d at 313.

99. *See id.*

100. *See id.* at 316.

101. *See id.* (citing United States v. Welch, 217 U.S. 333, 339 (1910)). The Fifth Amendment states that private property shall not "be taken ... without just compensation." U.S. CONST. amend. V.

102. *Bormann*, 584 N.W.2d at 319-320 (citing Richards v. Washington Terminal Co., 233 U.S. 546, 553 (1914)).

103. *Id.* at 321.

104. *See, e.g.*, Bruce v. Martin-Marietta Corp., 544 F.2d 442, 447 (10th Cir. 1976) ("A consumer would not expect a Model T to have the safety features which are incorporated in automobiles made today.").

105. *See* Matthew William Stevens, Survey, *Strictly No Strict Liability: The 1995*

different ways.[106] For example, courts disagree over whether state-of-the-art defenses may be asserted in strict liability cases.[107] Similarly, jurisdictions differ regarding whether a state-of-the-art defense functions as an absolute defense or whether it operates as a mitigating factor to be weighed along with a variety of other circumstances.[108] The recent *Restatement (Third) of Torts* effectively abolished the defense and replaced it with a broader, more generic standard.[109] Under the Restatement, a product is designed defectively if the plaintiff establishes that a safer alternative design could have been adopted, even though such a design had not been "adopted by any manufacturer, or even considered for commercial use."[110] The ramifications of the Restatement's have not yet been clear because the change is too recent to have affected court holdings.

Despite the uncertainty over the state-of-the-art defense in products liability cases, the defense remains a significant factor in nuisance suits. The North Carolina Supreme Court has recognized that although the state-of-the-art defense does not erect a complete bar to nuisance claims, it can be used as a mitigating factor in

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Amendments to Chapter 99B, the Products Liability Act, 74 N.C. L. REV. 2240, 2249-50 (1996) (quoting Charles C. Marvel, Annotation, *Strict Products Liability: Liability for Failure to Warn as Dependent on Defendant's Knowledge of Danger*, 33 A.L.R. 4th 369, 371 (1984)). Since scientific and technological knowledge is limited, certain risks and safety measures remain unknown until an injury occurs. *See* David G. Owen, *Defectiveness Restated: Exploding the "Strict" Products Liability Myth*, 1996 U. ILL. L. REV. 743, 782. Often, manufacturers sued for product-related injuries will claim that their product was designed or manufactured according to the best available technology or was state of the art at the time of production. *See id.* at 783.

106. *See* Geraint G. Howells & Mark Mildred, *Is European Products Liability More Protective Than the* Restatement (Third) of Torts: Products Liability?, 65 TENN. L. REV. 985, 1021 (1998).

107. *Compare* Hayes v. Ariens Co., 462 N.E.2d 273, 277 (Mass. 1984) (noting that a state-of-the-art defense is not relevant for strict liability purposes), *with* Anderson v. Owens-Corning Fiberglas Corp., 810 P.2d 549, 550 (Cal. 1991) (holding that a defendant in a strict liability case is permitted to present evidence to support a state-of-the-art defense).

108. *Compare* KY. REV. STAT. ANN. § 411.310(2) (Michie 1992) (creating a presumption that if a product conforms to generally recognized and prevailing standards or the state-of-the-art in existence at the time the design was prepared, it is not defective), *and* IOWA CODE ANN. § 668.12 (West 1987) (stating that conformance with the state of the art at the time the product was designed is an absolute defense), *with* O'Brien v. Muskin Corp., 463 A.2d 298, 305 (N.J. 1983) ("[S]tate-of-the-art evidence is relevant to, but not necessarily dispositive of, risk-utility analysis."), *and* Sumnicht v. Toyota Motor Sales, U.S.A., Inc., 360 N.W.2d 2, 17 (Wis. 1984) ("A product may be defective and unreasonably dangerous even though there are no alternative, safer designs available.").

109. *See* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. d, at 20 (1997); Larry S. Stewart, *A New Frontier: Design Defects Cases and the New Restatement*, TRIAL, Nov. 1998, at 20, 21.

110. RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2 cmt. d, at 20.

assessing the reasonableness of a party's conduct.[111] As such, a defendant has the ability to show that the use of such technology effectively eliminates a nuisance. The difficulty with asserting the defense, however, is that the use of the best available technology is not conclusive or controlling.[112] Instead, the technology used will be assessed, along with a variety of other factors,[113] to determine whether the operation of the facility is reasonable under all the circumstances.[114] Thus, asserting that one's hog facility has implemented the best available technology will only provide a full defense against a nuisance claim if that technology completely abates the nuisance. Otherwise, a plaintiff's nuisance claim can succeed despite the presentation of evidence showing that the defendant used state-of-the-art technology provided the plaintiff can show that the defendant substantially interfered with the reasonable use and enjoyment of the plaintiff's property.[115]

Another problem with applying the state-of-the-art defense in nuisance claims is that it focuses on the knowledge of the defendant, which is important in products liability but is not an essential element in nuisance law. Traditionally, the state-of-the-art defense precluded manufacturer liability unless the manufacturer had failed to warn consumers of the inherently dangerous aspects of a product where the manufacturer either knew or should have known of the product's dangerousness.[116] Even though *Restatement (Third) of Torts* eliminated the term "state of the art," its drafters still adopted the rationale that a manufacturer is liable only for foreseeable risks and is required to adopt only those risk avoidance measures that are "reasonably knowable and otherwise commercially feasible at the time of sale."[117] The difficulty in applying a state-of-the-art defense in hog farm odor nuisance suits, however, is that the defense only applies if the defendant's knowledge is a prerequisite to recovery,[118] but knowledge is *not* essential to liability in a nuisance claim.[119] A

111. *See* Watts v. Pama Mfg. Co., 256 N.C. 611, 618, 124 S.E.2d 809, 814 (1962).

112. *See id.* at 616, 124 S.E.2d at 813.

113. *See supra* note 74 (listing the factors used to determine the reasonableness of defendants' actions in nuisance suits).

114. *See Watts*, 256 N.C. at 618, 124 S.E.2d at 814.

115. *See id.*; Morgan v. High Penn Oil Co., 238 N.C. 185, 193, 124 S.E.2d 682, 689 (1953); *Barefoot*, 130 N.C. App. at 26, 502 S.E.2d at 48.

116. *See* Stevens, *supra* note 105, at 2249-50.

117. Owen, *supra* note 105, at 783; *see also* RESTATEMENT (THIRD) OF TORTS: PRODUCTS LIABILITY § 2, cmt. d, at 19-20 (explaining that liability attaches only to foreseeable risks).

118. *See* T & E Indus., Inc. v. Safety Light Corp., 587 A.2d 1249, 1260 (N.J. 1991).

119. *See Watts*, 256 N.C. at 616, 618, 124 S.E.2d at 813, 814. The test of what constitutes

hog farmer can be liable for creating a nuisance even though he is ignorant of the odor's existence. Thus, unless a defendant can show that using state-of-the-art technology completely abated the alleged nuisance, the defense will only be useful as a factor in determining the reasonableness of the defendant's conduct weighed against various other factors.[120]

The state-of-the-art defense also raises issues with respect to what constitutes the cutting edge in modern hog farming operations. Today's industrialized hog farms raise a significantly larger number of hogs on roughly the same amount of land as traditional, family-owned hog farms.[121] This change has increased the volume of hog waste and has intensified related odors. North Carolina raises more than ten million hogs annually,[122] producing over nine million tons of waste[123] which is commonly stored in open-pit "lagoons" where the waste remains until it eventually is used as fertilizer.[124] Hog farms use one of two types of waste lagoons: aerobic lagoons or anaerobic lagoons.[125] Lagoon systems are designed to convert the organic

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a nuisance is whether an actor's conduct substantially and unreasonably interferes with the use and enjoyment of a person's property. *See id.* at 618, 124 S.E.2d at 814; *Morgan*, 238 N.C. at 193, 77 S.E.2d at 689; *Barefoot*, 130 N.C. App. at 26, 502 S.E.2d at 48.

Knowledge is a factor, however, in determining whether certain conduct constitutes an intentional nuisance. *See Morgan*, 238 N.C. at 194, 77 S.E.2d at 689. According to *Morgan*, liability for an intentional nuisance attaches when someone either knows or is substantially certain that his conduct is causing a nuisance. *See id.* The problem is that even if a hog farmer claims that she implemented the best available technology at the time of design and construction of her facility, it is difficult to argue that she did not know or did not have constructive knowledge that her hog farm would generate odor. Odors are a natural and expected byproduct of hog farms. Therefore, the state-of-the-art defense does not insulate hog farmers from intentional nuisances because of the inherent nature of hog farms and their unavoidable creation of odors. *Cf. id.* (stating that actual or constructive knowledge that a nuisance will result from a person's conduct is sufficient to constitute an intentional nuisance).

120. *See supra* note 115 and accompanying text.

121. *See* TASK FORCE, *supra* note 1, at 5 (noting that the tremendous growth in North Carolina's hog production has occurred on farms that already housed hundreds or even thousands of hogs at one site.

122. *See* Silverstein, *supra* note 2, at 33. Iowa is the nation's leading hog producer, raising more than 14.5 million hog annually. *See id.* at 31.

123. *See* Rogers, *supra* note 2, at 1B. For updates on the amount of waste deposited by North Carolina hogs since January 1, 1999, see Environmental Defense Fund, *Hogwatch* (visited Apr. 22, 1999) <http://www.hogwatch.org/resourcecenter/counter.html>.

124. *See* Brian Feagans, *New Ways to Handle Hog Waste Sought*, SUNDAY STAR-NEWS (Wilmington, N.C.), Feb. 28, 1999, at Supp. 19.

125. *See* Richard E. Nicolai, *Managing Odors from Swine Waste*, AGRIC. ENGINEERING UPDATE (Dep't of Biosys. & Agric. Eng'g, Univ. of Minn., St. Paul, Minn.), June 30, 1995, at 3. Aerobic lagoons need oxygen for the waste-decomposing microorganisms to thrive, while anaerobic lagoons are not oxygen dependent. *See id.*

matter in manure into stable products.[126] While the relatively mild odor produced by aerobic lagoons is a benefit from using such systems, the substantial cost of installing and operating aerobic facilities is a drawback.[127] As a result, most hog farms, including the Barefoots' farm, use anaerobic waste lagoons.[128]

Whether hog waste decomposes aerobically or anaerobically, the odors that emanate from these lagoons are comprised of a mixture of gas, vapor, and dust.[129] The odors from anaerobic lagoons, however, often are more offensive than the odors from aerobic lagoons.[130] Anaerobic lagoons release a variety of gases—including ammonia and hydrogen sulfide, which create that familiar rotten-egg stench—as well as pungent fatty acids and 150 other volatile compounds.[131] Dust and other airborne particles originating in hog pens not only contain pathogens and physical irritants, but also transport many of the compounds produced by waste lagoons.[132] The type of gaseous mixture created depends upon the location of the hog facility, the size and type of the operation, particular production practices, as well as meteorological conditions.[133] Consequently, it is difficult to determine which compound or combination of compounds is responsible for the offensive odors emanating from a particular hog farm and, thus, to target and alleviate the noxious odors.[134]

Because the Barefoots chose to install an anaerobic lagoon system to treat hog waste on their farm, the odors emanating from

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126. *See id.* Lagoon systems treat waste by converting it into carbon dioxide, methane, ammonia, and other gaseous compounds; organic acids; and cell tissue. *See* Act of Oct. 16, 1998, ch. 188, sec. 2, 1998 N.C. Adv. Legis. Serv. 72. (detailing the various stable products produced through both the aerobic and anaerobic decomposition process).

127. *See* Nicolai, *supra* note 125, at 3.

128. *See* Mark Sobsey, *Human Health Issues* (visited Apr. 22, 1999) <http://www.hogwatch.org/resourcecenter/onlinearticles/sos/sobsey.html>; *see also Barefoot*, 130 N.C. App. at 19, 502 S.E.2d at 44 (describing the Barefoots' lagoon). The North Carolina legislature has recently directed the state Department of Agriculture to develop a plan to phase out the use of anaerobic lagoons and sprayfields as the primary methods of disposing of animal waste at hog farms. *See* Act of Aug. 27, 1997, ch. 458, sec. 12.4, 1997 N.C. Sess. Laws 1959.

129. *See* TASK FORCE, *supra* note 1, at 15.

130. *See id.* at 19.

131. *See id.* at 15. These other compounds are the result of biological reactions within the waste lagoon. They include "organic acids, alcohols, aldehydes, fixed gases, carbonyls, esters, amines, sulphides, mercaptans, and nitrogen heterocycles." *Id.*

132. *See id.*

133. *See id.*

134. Hog farm odors generally originate from four areas: (1) buildings and holding facilities; (2) manure storage and treatment areas; (3) areas on which lagoon liquids and sludge have been applied; and (4) carcass disposal areas. *See id.* at 16-19 (providing a detailed discussion regarding how odors occur in each of these sources).

their lagoon were more intense and more constant than if they had installed an aerobic lagoon system. Perhaps anticipating problems, the Barefoots attempted to alleviate their lagoon's odor by encircling it with acres of crops, trees, and forest.[135] In addition, they used the expertise of the Soil Conservation Service in designing and constructing their facility.[136] Finally, the Barefoots not only installed an underground irrigation system, but also built the lagoon twenty percent larger than required in a further attempt to reduce odor.[137]

The question remains: What more could the Barefoots have done to alleviate the nuisance? Various technologies have been developed to address the chronic problem of hog-farm odors.[138] For example, two devices quantitatively measure odor: the Scentometer™ and the Odor Monitor™.[139] Although each device has its limitations, the two instruments generally correspond in their measurement and rankings of tested odors, and each device provides farmers with a means of detecting an increase in the intensity of noxious fumes.[140] In addition, several odor-reducing techniques have been developed. First, farmers can alter their hogs' diets, decreasing the amount of ammonia, nitrogen, and other odorous compounds produced.[141] Farmers can also use odor-controlling additives to treat or prevent odors in hog-storage houses and waste lagoons.[142]

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135. *See Barefoot*, 130 N.C. App. at 19, 502 S.E.2d at 44.

136. *See id.*

137. *See id.*

138. There is no precise method available to measure odors objectively, particularly since the offensiveness of an odor does not necessarily correspond to its intensity. *See* TASK FORCE, *supra* note 1, at 38. Odors produced by hog farms often are intermittent and usually are difficult to detect simply by measuring airborne concentration of compounds. *See id.*

139. *See id.* at 39-40. The Scentometer™ Model SCC requires the user to inhale through two nostril inserts. *See id.* "The user first receives odor-free air and then a sequence of increasingly odorous samples, and a threshold is established when the user first detects the odor. An odor's magnitude is determined by the number of dilutions required to reach the threshold." *Id.* at 40. Unlike the Scentometer™, the Odor Monitor™ does not require the use of human subjects, but instead evaluates odors by measuring the odor-causing molecules in the air. *See id.*

140. *See id.*

141. *See id.* at 41. There are several approaches available regarding feed conversion and odor control to make effective dietary improvements for hogs. One approach to improve the diet of hogs in order to decrease nitrogen production is the substitution of synthetic amino acids in place of traditional protein sources. *See id.* at 42. A second approach is to use proteolytic enzymes to increase the digestibility of protein. *See id.* Other options include the addition of odor absorbers, plant extracts, or enzymes to hog feed in order to aid in the control of odors generated by hogs. *See id.*

142. *See id.* at 43-44. A number of additives are available to neutralize odors. Aromatic oils, used either as masking agents or as counteractants, are one option to control odors. *See id.* at 43. In addition, digestive deodorants, external odor absorbents,

Another option is to install mechanical technologies, including biological filters, catalytic converters, condensers, incinerators, and scrubbers.[143] As a final option, farmers can install an effective ventilation system to diminish the intensity of hog-related odors.[144] Notwithstanding the availability of a wide selection of odor-reducing technologies and techniques, however, the most effective method to control odors is the overall design, siting, and management of the hog farm to maintain control over the cleanliness of both the hogs and the facilities.[145]

While these factual and legal issues call into question the utility of the state-of-the-art defense in nuisance suits against hog farms, the *Barefoot* court's ruling suggests that the defense may now become an issue every time the parties introduce evidence regarding a hog farm's design. Accordingly, *Barefoot* is significant in several ways. The first significant aspect of the case stems from the difference between the majority's and the dissent's interpretations of whether the evidence presented by the defendant-appellees constituted a state-of-the-art defense. The majority emphasized that the jury could have reasonably interpreted the Barefoots' case as an affirmative state-of-the-art defense.[146] The dissent, however, viewed the defendant-appellees' claims that their hog farm was a state-of-the-art facility as simply a rebuttal to the plaintiff-appellants' claims that the substandard design of the farm caused noxious odors.[147] The dissent argued that the Barefoots were not advancing a state-of-the-art defense and, therefore, that the trial court was not required to instruct the jury about the substantive law of such a defense.[148] The majority's opinion creates a relatively low threshold for determining whether the evidence and testimony presented at trial constitute a state-of-the-art affirmative defense. According to the court of

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and a variety of chemical deodorants provide viable options to mitigate odors. *See id.* at 43-44.

143. *See id.* at 56. All of these options pose significant financial costs, so the hog industry has been reluctant to embrace them. *See id.*

144. *See id.* at 45-47. Proper ventilation prevents the accumulation of noxious gases that result from decomposing manure. *See id.* at 46. As a result, the design of the ventilation system is crucial in determining whether the dispersion of odorous fumes will be released in a constant, diluted manner or whether those fumes will be emitted in occasional, but highly concentrated, doses. *See id.*

145. *See id.* at 74; *see also* Nicolai, *supra* note 125, at 2 (noting that management practices and common sense are key determinants in controlling hog farm odors).

146. *See Barefoot*, 130 N.C. App. at 23, 502 S.E.2d at 46.

147. *See id.* at 27, 502 S.E.2d at 49 (Martin, J., dissenting).

148. *See id.* at 27, 502 S.E.2d at 48 (Martin, J., dissenting) (citing State v. Agnew, 294 N.C. 382, 395, 241 S.E.2d 684, 692 (1978)).

appeals, the introduction of almost any evidence about the design and construction of the hog farm, regardless of the subjective motive for its introduction, is sufficient to constitute a state-of-the-art defense.[149] Consequently, once such evidence is introduced, a trial court is now required to instruct the jury, at least in substance, that the use of state-of-the-art or best-available technology does not absolve liability in a nuisance claim.[150] Failure to provide this instruction is reversible error.[151]

Barefoot is also significant because it affirms that hog farm owners cannot avoid nuisance liability simply by using the best technology available, maintaining and operating their farms in compliance with government regulations, using a reasonable design, and implementing state-of-the-art technology.[152] While these factors may be used to weigh the evidence and the severity of the interference with neighboring landowners' use of their properties, they do not bar the claim itself.[153]

Barefoot, in combination with the recent legislative efforts to curb the impacts associated with the corporate hog industry, provides the first incremental gains in decades for those communities that have had to absorb the financial and environmental burdens of the vertical integration of hog farming. Of course, the ultimate decision as to whether certain conduct constitutes a nuisance remains in the hands of the jury,[154] and determining whether the new instructions will affect juries' decisions must await the results of subsequent cases. While *Barefoot* emphasizes that the use of state-of-the-art technology in the operation and design of a hog facility is not a complete defense to a nuisance suit,[155] the trajectory of that rule may be relatively flat. The most significant barrier to these types of lawsuits is that they

149. *See id.* at 23-24, 502 S.E.2d at 46-47.

150. *See id.* at 26, 502 S.E.2d at 48.

151. *See id.* at 20, 502 S.E.2d at 44; *see also* Bass v. Hocutt, 221 N.C. 218, 219, 19 S.E.2d 871, 872 (1942) (holding that a trial court's failure to provide the substance of the state of the law in a jury instruction as requested by a party is reversible error); Calhoun v. State Highway and Public Works Comm., 208 N.C. 424, 424, 181 S.E. 271, 272 (1935) (same); Parks v. Security Trust Co., 195 N.C. 453, 453, 42 S.E. 473, 473 (1928) (same); Michaux v. Paul Rubber Co., 190 N.C. 617, 619, 130 S.E. 306, 307 (1925) (same); Marcom v. Durham & S.R. Co., 165 N.C. 259, 259-60, 81 S.E. 290, 291 (1914) (same); Irvin v. Southern R.R. Co., 164 N.C. 5, 17-18, 80 S.E. 78, 83 (1913) (same); Faeber v. E.C.T. Corp., 16 N.C. App. 429, 430, 92 S.E.2d 1, 2 (1972) (same).

152. *See Barefoot*, 130 N.C. App. at 26, 502 S.E.2d at 48.

153. *See id.* at 22-23, 502 S.E.2d at 46.

154. *See id.*; *see also* Watts v. Pama Mfg. Co., 256 N.C. 611, 618, 124 S.E.2d 809, 814 (1962) (listing several factors to be considered by a jury in determining the reasonableness of a defendant's conduct).

155. *See Barefoot*, 130 N.C. App. at 22, 502 S.E.2d at 45.

inevitably are brought in counties whose residents are heavily dependent upon the hog industry for their employment and livelihood. Combine demographics, geography, and economics with the commonly held view that a person should be free to use her property as she chooses, and the outcomes of these types of lawsuits may not change, despite *Barefoot*.[156]

Although *Barefoot* illustrates the viability of nuisance claims to combat the emission of hog odors and other related hog farm impacts, a more prudent approach for future plaintiffs may be the one taken by the plaintiffs in *Bormann v. Board of Supervisors*, who successfully argued that Iowa's right-to-farm laws constituted an unconstitutional taking of property without just compensation by allowing farmers easements over their neighbors' property.[157] A successful constitutional challenge to North Carolina's right-to-farm statutes could have several significant effects. A successful suit would require the state either to pay just compensation to those potentially affected by hog-farm odors or to invalidate the right-to-farm statute.[158] Under either scenario, neighboring property owners of hog farms would benefit because they could bring nuisance claims regardless of the size of the farm. Although the potential cost to the hog industry is significant, hog farming's cost to tourism, public health, and the environment in North Carolina has already proven expensive.

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156. A year before the trial court decision in *Barefoot*, another Johnston County jury determined that there was "nothing patently unreasonable" with having to reside near a hog farm. Joby Warrick, *Jury Rejects Claim Against Hog Operation*, NEWS & OBSERVER (Raleigh, N.C.), Aug. 31, 1996, at 3A (providing background on hog farming litigation after the *Barefoot* trial). Former United States Senator Robert Morgan observed, as long as " '[p]eople . . . still have this feeling that, "[i]t's my land, and . . . I'll do whatever I want with it," ' " there will not be " 'a sympathetic jury in Johnston County.' " *Id.* (quoting Robert Morgan). Mr. Morgan served as the plaintiffs' attorney in *Barefoot*. *See id.*

157. 584 N.W.2d 309 (Iowa 1998), *cert. denied sub nom.* Girres v. Bormann, 119 S. Ct. 1096 (1999). For a discussion of *Bormann*, see *supra* notes 96-103 and accompanying text.

158. Invalidation of the statute would not necessarily avoid the compensation issue. *See, e.g.*, First English Evangelical Lutheran Church of Glendale v. County of Los Angeles, 482 U.S. 304, 318 (1987) (holding that regulations which temporarily deprive a landowner of all use of her property require compensation under the Fifth Amendment even if the government later abandons those regulations).