A COMPARISON OF US AND UK LAW REGARDING POLLUTION FROM AGRICULTURAL RUNOFF

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I. INTRODUCTION

Water pollution resulting from the spreading or discharge of livestock effluent and the excessive use of fertilizers generates considerable concern in

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the regulatory community. In particular, many policymakers from the United States and the United Kingdom express anxiety over the potentially damaging environmental effects from concentrating large amounts of livestock on small areas of land and the associated land application of manure. It is the purpose of this Article to compare the approaches developing in both the United States and the United Kingdom which address agricultural runoff and water quality issues. Before proceeding to the legal analyses, however, it is worthwhile to set the stage and examine the evolution of agricultural production practices. Fundamental changes in the nature and scope of agricultural operations account for an increased sensitivity to the potential pollution problems they engender. Using dairy production as a lens for examining the new shape of agriculture, this Article will explore in detail the environmental regulations surrounding industrialized agriculture.

This Article will utilize some of the experience and original data collected by the Texas Institute for Applied Environmental Research (TIAER) in Erath County, Texas, the state's number one milk producing region. For nearly three years TIAER has conducted *Livestock and the Environment: A National Pilot Project* (NPP) pursuant to Environmental Protection Agency (EPA) sponsorship in the 290,000 acre Upper North Bosque River watershed.[1] The watershed includes approximately 86 dairies totaling 26,000 cows.[2] Nutrient polluted surface waters provided the project's primary focus, directing some attention to nutrient leaching through the vadose zone and livestock odor.

II. HISTORICAL OVERVIEW OF THE EVOLUTION OF RURAL AREAS

The twentieth century has witnessed a transformation in the character of agricultural areas in the United States and the United Kingdom. In prior times, agricultural production occupied the majority of the workforce and the population was dispersed throughout the countryside. A unique culture took root on the farms. As Don Paarlberg observed in his study of farming institutions:

> [m]any years ago agriculture was basically different from other occupations; it was more a way of life than a business. Farmers were self-sufficient. They bought and sold little; they took to market only what was in excess of their family needs. Despite regional differences, there was a generally recognizable rural culture, tradition, and life-style.[3]

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1. RON JONES & LARRY FRAREY, LIVESTOCK AND THE ENVIRONMENT: A NATIONAL PILOT PROJECT DETAILED PROBLEM STATEMENT 4 (1993).

2. *Id.* at 6. Notably, the United Kingdom presently contains approximately 11,250 cattle. MINISTRY OF AGRICULTURE, FISHERIES & FOOD AGRICULTURAL STATISTICS 6-7 (1994). Its intensive production centers are located in the southern areas of England. DALE LEUCK ET AL., UNITED STATES DEPARTMENT OF AGRICULTURE, THE EU NITRATE DIRECTIVE AND CAP REFORM: EFFECTS ON AGRICULTURAL PRODUCTION, TRADE, AND RESIDUAL SOIL NITROGEN 3-4 (1995).

3. DON PAARLBERG, FARM AND FOOD POLICY, ISSUES OF THE 1980'S 5 (1980).

> Over time this romantic family farm began to disappear as more and more individuals sought out opportunities in the cities and urban areas: From colonial times until late in the nineteenth century farmers outnumbered all other vocational groups combined. The present minority status of agriculture came by decrements. In the census of 1920, for the first time, the urban category exceeded the rural, farm and nonfarm combined. By 1950 farmers were a minority in the rural areas; nonfarmers . . . outnumbered farmers six to one in rural America. And in 1967 an incredible thing happened; for the first time the nonfarm incomes of farm people exceeded their farm incomes.[4]

Statistics released from the United States Census Bureau confirm this picture. In 1790, 95% of the population lived in rural areas, virtually all on farms.[5] At the turn of the century, farm residents amounted to 40% of the population.[6] By 1993, they constituted only 1.9% of the national population.[7] So too, in the United Kingdom, modifications are apparent. As Stephen Tromans, a British solicitor observed,

> Significant changes have developed in agriculture since the 1950s. Increased mechanization and the use of more powerful and efficient machinery demand larger fields and allow greater changes, for example, altering drainage systems and removing hedgerows. Agricultural manpower has diminished . . . . The amalgamation of farm holdings has resulted in larger fields, the removal of old boundaries and the availability of more capital to fund changes. The effort to specialize and concentrate agricultural production has brought about a diminution in the number of mixed farms . . . .[8]

From the 1950s to the 1970s, the British Government also played an active role in encouraging the modernization and expansion of agriculture.[9]

A. *Transformation of Livestock Production*

An essential change in the structure of agriculture accounts for much of the shift in rural demographics. As two Cornell University rural sociologists observed, "[h]istorically, entrepreneurial, small-scale units of production mixing family assets and management with seasonal or permanent hired labor typified U.S. agriculture. In recent years, however, vertically integrated,

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4. *Id.* at 8 (citations omitted).

5. U.S. DEPT. OF COMMERCE, BUREAU OF THE CENSUS, RESIDENTS OF FARMS AND RURAL AREAS: 1990, at 3 (Mar. 1992).

6. *Id.*

7. Barbara Vobejda, *U.S. Ends Survey of Its Dwindling Farm Population*, CHICAGO SUN-TIMES, Oct. 9, 1993, at 6.

8. Stephen Tromans, *Agriculture and the Protection of Rural Amenity*, 4 CONN. J. INT'L. L. 305, 306-07 (1989).

9. *Id.* at 307.

industrialized farming has begun rapidly displacing production dominated by single families."[10] Recent decades have transformed agriculture into a mechanized, industrial process. While small operations still exist, the trend is towards concentration. Farming ventures from across the spectrum of agricultural activities may realize the benefits of economies of scale by enlarging. Today, five percent of farms account for more than fifty percent of sales.[11] As Lee Christensen found, "[g]enetic improvement, labor saving production techniques, feed formulation advances, and processing automation have forced changes. Much of the innovations have resulted in significant economies of size and reduced labor at all levels."[12]

One may witness the move towards concentration in a variety of United States sectors. For example, there were nearly 3 million pork producers in 1950, but only 256,000 in 1992.[13] "Farms have grown in size with about 6 percent of these producers raising 60 percent of the hogs. Nearly 80 percent of the hogs are grown on farms producing 1,000 or more hogs per year."[14] According to a University of Missouri survey, more than 25% of all hogs marketed come from operations producing 10,000 or more hogs per year.[15]

The poultry industry also reflects the increasing concentration of agriculture.[16] Small chicken enterprises began declining in the late 1950s. In 1992, 55 companies maintained flocks of 1 million or more and produced 168.8 million layers.[17] Notably, the twenty largest boiler producers accounted for over 80% of the national broiler industry.[18]

For dairies the picture is the same. Even though most dairies remain family run operations, a diminished number of dairies have produced more milk with fewer cows over the span of the last 58 years. In 1934, approximately 4.5 million United States farms milked approximately 24.5 million dairy cows, averaging 5.4 cows per farm.[19] In the same year, average milk production amounted to 40.3 hundredweight per cow per year (CWT/cow/year).[20] By 1987, "202,068 dairies and approximately 10.3 million cows supplied the nation's milk."[21] The average dairy milked 51 cows

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10. Charles Geisler & Thomas Lyson, *The Cumulative Impact of Dairy Industry Restructuring*, 41 BIOSCIENCE 560 (1991).

11. *Id.*

12. Allan Butcher et al., *Livestock and the Environment: Emerging Issues for the Great Plains*, 1993 CONSERVATION OF GREAT PLAINS ECOSYSTEMS: CURRENT SCIENCE, FUTURE OPTIONS 365, 368.

13. *Id.* at 367.

14. *Id.*

15. Steve Marbery, *Pork Production Shifts to Larger Farms*, FEEDSTUFFS, Nov. 30, 1992, at 1.

16. *See* JONES & FRAREY, *supra* note 1, at 12.

17. *Id.*

18. *Id.*

19. TIAER, LIVESTOCK AND THE ENVIRONMENT: RETHINKING ENVIRONMENTAL POLICY, INSTITUTIONS & COMPLIANCE STRATEGIES 46 (1992).

20. *Id.*

21. *Id.*

and average annual milk production rose to 138.02 CWT/cow/year.[22] Today, in Tulare County, California, the average dairy hosts 900 cows, with 17 operations milking over 2,000 cows.[23]

Economies of scale and the adoption of new technologies by producers explain the evolving structure of agricultural production.

> On-farm technological progress and, accordingly, higher milk production have been achieved through dairy producers' adoption of artificial insemination and related breeding innovations, improvements in animal nutrition and forage testing, participation in Dairy Herd Improvement Association (DHIA) record-keeping, experimentation with automated feeding equipment and three times a day milking, and improvements in dairy housing.[24]

These technological advances often appear in the large dairies which can afford to implement expensive innovations relatively easily. Empirical studies reveal that a dairy's per unit cost of producing milk falls as the number of cows milked increases.[25]

B. *Modern Pollution Concerns*

The industrialization of dairy farming and diverse agricultural sectors has, however, other consequences. The waste disposal practices of many concentrated livestock operations may lead to water quality degradation.[26] In contrast to traditional grazing operations, most industrialized producers collect manure from animal confinement areas, place the waste in lagoons, and then apply it to farmland in bulk.[27] There, the manure acts as a nutrient

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22. *Id.*

23. UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION TULARE COUNTY, THE MILK LINES 1 (1995).

24. TIAER, *supra* note 19, at 46-47.

25. UNITED STATES CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, UNITED STATES DAIRY AT A CROSSROAD: BIOTECHNOLOGY AND POLICY CHOICES 18 (1991); J. HOLT ET AL., PANEL FARM BASE BOOK: DAIRY FARMS (Agricultural and Food Policy Center Data Base Report 90-1, Texas A&M) (1990); AMY PAGANO ET AL., A NATIONAL PILOT PROJECT, LIVESTOCK AND THE ENVIRONMENT: PROFILES OF REPRESENTATIVE ERATH COUNTY DAIRIES 33 (draft report, TIAER, Texas A&M) (1992); Scott C. Matulich, *Efficiencies in Large-Scale Dairying: Incentives for Future Structural Change*, 60 AM. J. AGRIC. ECON. 642-47 (1978).

26. TIAER, *supra* note 19, at 12. The waste produced at large livestock production facilities is remarkable in terms of both quantity and pollutant content. An average 1000-pound milk cow produces approximately 82 pounds of wet manure per day—20 times that of an adult human—containing elevated levels of nitrogen, phosphorus, and fecal bacteria. *Id.* The crucial difference between human and livestock waste, however, is that the former is treated prior to discharge while the latter is land applied with virtually no prior treatment.

27. E.P. Taiganides, *Animal Waste, Solid Waste Management: Selected Topics*, *in* 1985 WORLD HEALTH ORGANIZATION, COPENHAGEN EUROPEAN REGIONAL OFFICE 151, 151 (Michael J. Suess ed., 1985).

source for crop production or simply rests at a convenient disposal site.[28] Operators must carefully manage the time, rate, and location of the application to avoid water quality degradation in these settings. In the Cornell study, researchers observed,

> [a]n important cumulative impact related to the changing spatial location of large dairy farms is the redistribution of massive amounts of animal wastes. After World War II, most dairy farmers returned cattle manure to their land, thereby enhancing soil fertility and keeping their need for chemical fertilizers at a minimum. Dairy restructuring is slowly altering this practice. First, as dairy operations increase in scale, the number of animals per dairy farm is rising. Second, with dairy industrialization, nutrient throughout increases to maximize milk output, and waste output also rises. Manure handling then presents a major diseconomy of scale, that is, size of operation yields economic liabilities . . . . This diseconomy is particularly important where proximity to urban areas poses added public health and environmental management costs.[29]

This waste problem creates several potential problems: the capacity of the waste to act as a potential environmental pollutant, public health/disease issues, and the limitations of current methods of waste handling, treatment, and disposal to control such problems. In particular, feedlot waste and wastewater may contain nitrates, pathogens, and toxic metals.[30] Elevated nutrient levels engender a significant change in water ecology.

> Phosphorus and nitrogen are critical to the life sustaining potential of surface water. However, large concentrations of these nutrients stimulate production of aquatic plants and disturb the balance of the ecosystem. Elevated concentrations of phosphorus can result in excessive aquatic plant growth and a depletion of oxygen in streams.[31]

Thus, eutrophication represents a significant potential problem. Elevated nitrogen and phosphorus levels, as well as associated algal blooms, can significantly increase the costs of filtering water systems.[32] They may also

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28. *Id.* at 192.

29. Geisler & Lyson, *supra* note 10, at 563 (citations omitted).

30. Taiganides, *supra* note 27, at 162.

31. JONES & FRAREY, *supra* note 1, at 21.

32. *See Whole Farm Planning in New York City Watershed*, COASTLINES, Spring 1995, at 1. Heavy nutrient loads, and the dangers represented by Giardia and Cryptosporidium, forced New York City to consider a $5-8 billion filtration system for its water supply. *Id.* Innovative planners decided to develop a comprehensive watershed management program focusing on agriculture's role in nonpoint source pollution prevention instead. *Id.* at 2. A successful program will enable New York City to avoid enormous expenditures and to retain land in agricultural use. *Id.*

contribute to dying fish, obnoxious odors, and the "blue baby syndrome" (methemoglobinemia).[33]

Water quality information gathered from March 1, 1991 through March 31, 1994, by TIAER shows the relationship between land uses, land practices, soils, and water quality indicators.[34] This data indicates that the runoff has occurred as a result of intensive agricultural production in the upper North Bosque River watershed.[35] Statistical analyses reveal "that certain land uses and watershed characteristics, most notably percent waste application fields, dairy cow density, percent woodland, and percent rangeland in agricultural watersheds,. have strong correlations to observed water quality."[36] In addition, phosphorus represents a significant nutrient in the watershed. "Comparison of water quality data to non-regulatory screening levels indicates that some waterborne constituents, especially orthophosphate and total phosphorus, exceed these screening levels in both urban and agricultural watersheds."[37] Data revealed a significant positive association of orthophosphate and total phosphorus as the percentage of waste application fields increased in the drainage basins above reservoir and stream sites.[38]

On the public health front, many people express concern about the potential of animal waste runoff to contaminate drinking water supplies with cryptosporidium.[39] A 1993 outbreak of cryptosporidium in Milwaukee caused 400,000 people to suffer through diarrhea, vomiting, and stomach cramps and caused dozens of others with compromised immune systems to die.[40] Local suspicion centered on an unusually heavy spring runoff that could have carried agricultural waste into the rivers feeding the water supply.[41] Such concerns appear warranted. Livestock represents a significant source of the parasite cryptosporidium.[42] Cattle, sheep, goats, and swine constitute the major vectors for cryptosporidium. The National Animal Health Monitoring System conducted a study to discover the extent of cryptosporidium infestation among dairies. A survey of 1,811 farms in 28 states revealed that on any given day, 22% of calves were positive for cryptosporidium and that more than 90% of all farms were infested.[43] The parasite

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33. Martha L. Noble & J.W. Looney, *The Emerging Legal Framework for Animal Agricultural Waste Management in Arkansas*, 47 ARK. L. REV. 159, 165 (1994).

34. ANNE MCFARLAND & LARRY HAUCK, LIVESTOCK AND THE ENVIRONMENT: SCIENTIFIC UNDERPINNINGS FOR POLICY ANALYSIS iii (TIAER, 1995).

35. *Id.*

36. *Id.* at 69.

37. *Id.*

38. *Id.*

39. Rob Gurwitt, *Something in the Water*, GOVERNING, Sept. 1994, at 32.

40. *Id.* at 34.

41. *Id.*

42. Jim Quigley, *Nearly All Herds Have Cryptosporidium*, HOARD'S DAIRYMAN, May 25, 1994, at 413.

43. *Id.*

is unusually infectious and resistant to chlorine treatment.[44] Dr. Herbert DuPont, professor at the University of Texas Medical School, observed that only thirty parasites were enough to infect one-fifth of his study volunteers.[45] He noted, "The infectiousness of this parasite will undoubtedly change the way water is treated in this country. It gets into our water supplies via animal or human sewage. It is not killed by chlorine. Only heat or filtration is effective against it."[46] In response to these issues, the EPA has proposed rules requiring public water systems to monitor for the parasite.[47]

III. REGULATION IN THE UNITED STATES: CLEAN WATER ACT AND CAFOS[48]

As a result of evolving livestock production practices, government regulators now recognize livestock waste as an environmental problem deserving concerted examination. Reported incidents of pollution from livestock waste are significant and widespread. A 1989 summary of state water quality assessments conducted under section 319 of the Federal Water Pollution Control Act[49] (Clean Water Act, CWA, or the Act) revealed that over one-third of all water impairments attributed to agricultural pollution were caused by livestock waste.[50] In a highly publicized incident occurring in July of 1995, a hog waste lagoon in North Carolina ruptured dumping 25 million gallons of contaminated water over the countryside and into the nearby New River.[51] Observers noted, "[I]t's being called the worst agricultural accident in North Carolina's history."[52]

The United States deals with livestock runoff primarily under the Clean Water Act and associated regulations. Essentially, the Clean Water Act divides pollutants into point sources and nonpoint sources.[53] Traditional point sources are discrete, identifiable emission sources such as industrial operations piping effluent into waterways.[54] Discharge from animal confinements and process areas also represent point sources of pollution.[55] In contrast, the application of manure solids and lagoon effluent to pasture or cropland may cause diffuse nonpoint source pollution in the presence of precipitation.

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44. Associated Press, *Drinking Water Parasite Infectious in Tiny Doses: Houston Man's Study May Spur Federal Action*, DALLAS MORNING NEWS, MAY 2, 1994, at 10D.

45. *Id.*

46. *Id.*

47. 40 C.F.R. § 141.141 (1996).

48. Portions of Part II first appeared in the following: Larry C. Frarey & Staci J. Pratt, *Environmental Regulation of Livestock Production Operations*, NAT. RESOURCES & ENV'T, Winter 1995, at 8, 12.

49. 33 U.S.C. § 1344 (1994).

50. Frarey & Pratt, *supra* note 48, at 8.

51. *Hog Waste Lagoon Ruptures—Twenty Five Million Gallons Worth* (National Public Radio broadcast, July 6, 1995) (transcript no. 1644-10).

52. *Id.*

53. 33 U.S.C. § 1344.

54. 40 C.F.R. § 122 (1996).

55. *Id.* § 122.23(a).

A. *Federal Regulation of Livestock Production Facilities*

The Clean Water Act authorizes the EPA to prevent the discharge of any pollutant into the navigable waters of the United States.[56] The definition of pollutant specifically includes both "solid waste" and "agricultural waste."[57] The EPA's jurisdiction is, however, generally invoked only in cases of "point sources."[58] Under statutory authority, the term point source refers to "any discernible, confined and discrete conveyance, including but not limited to any . . . concentrated animal feeding operation (CAFO) . . . from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture."[59] The statute, therefore, specifically refers to CAFO operations as part of the EPA's mandate.

A point source, such as a CAFO, may still discharge pollutants pursuant to the terms of a National Pollutant Discharge Elimination System (NPDES) permit issued by the EPA Administrator or appropriate state pollution control authority.[60] Section 1342 establishes a permitting scheme under which the EPA "may . . . issue a permit for the discharge of any pollutant, or combination of pollutants . . . upon such conditions as the Administrator determines are necessary to carry out the provisions of this chapter."[61] In the absence of a permit, the discharge of any pollutant is unlawful.[62] The Fifth Circuit described the purpose of the system:

> Congress passed the Federal Water Pollution Control Act Amendments in 1972 with the stated purpose of restoring and maintaining the integrity of the nation's waters. To achieve this goal, the Act requires the strict enforcement of certain technology-based effluent limitations. As the primary means for enforcing these effluent limitations, Congress established the NPDES permit system. In order for any person lawfully to discharge any pollutant from a point source into navigable waters of the United States, that person must obtain an NPDES permit and comply with its terms.[63]

Thus, an NPDES permit serves to transform generally applicable effluent limitation and other water quality standards into the obligations of the individual discharger.[64] The EPA establishes these effluent limitations guide-

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56. 33 U.S.C. §§ 1251(d), 1311 (1994).
57. *Id.* § 1362(6).
58. *Id.* § 1362(12).
59. *Id.* § 1362(14).
60. *Id.* § 1342(f).
61. *Id.* § 1342(a)(l).
62. *Id.* § 1311(a).
63. Carr v. Alta Verde Indus., 931 F.2d 1055, 1058 (5th Cir. 1991) (citations omitted).
64. *Id.* at 1059.

lines for existing point sources based on the application of the "best available technology (BAT) economically achievable."[65]

CAFOs are the only type of agricultural production operation regulated by the EPA or the delegated states under the NPDES program.[66] In contrast, most agricultural pollution falls under the category of nonpoint source pollution. Nonpoint source pollution is comprised largely of precipitation-induced surface runoff or leaching through soil layers.[67] This area is addressed principally through state nonpoint source pollution assessments and management plans developed pursuant to CWA section 319 and coastal zone management plans. Thus far, the EPA has delegated NPDES authority to thirty-nine states.[68] The EPA and many delegated states have treated CAFOs as a relatively low priority when contrasted with industrial and municipal point source dischargers and have failed to vigorously pursue CAFO permitting. Consequently, in 1992, less than 10% of the estimated 10,000 livestock operations classified as CAFOs held an NPDES permit, even though the EPA initially promulgated NPDES CAFO regulations in 1974.[69]

A livestock production operation must qualify as an "animal feeding operation" prior to designation as a CAFO point source by the EPA.[70] The EPA regulations define an animal feeding operation as a facility that confines or maintains animals for a total of forty-five days or more in any twelve month period and, as a result, cannot sustain crops or vegetative growth over any portion of the lot or facility.[71] The specific animals confined throughout the twelve month period may change any number of times; the forty-five days need not be consecutive nor must the twelve month period correspond to the calendar year. The most important criterion for determining whether animals are confined or maintained in a facility is that animal waste be generated in that specific facility.[72] As a result, "stomped out" areas where livestock congregate for a total of forty-five days or more per year likely satisfy the definition of animal feeding operation.[73]

The EPA may classify an animal feeding operation as a CAFO in two different ways: 1) the facility contains more than 1000 animal units; or 2) the facility contains more than 300 animal units and discharges pollutants directly into waters of the United States or through a man-made ditch, flushing system, or similar device.[74] Significant ambiguity exists concerning the scope of a

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65. *Id.*

66. 40 C.F.R. § 122.23(a). The EPA has delegated CAFO regulatory authority to forty states. *See* 33 U.S.C. § 402(b) (1994). Livestock operations in nondelegated states must obtain both state and EPA permits.

67. 33 U.S.C. § 1362(14).

68. *Id.* § 402(b).

69. *See* Larry Frarey, *Jurisdictional and Enforcement Issues Under the New EPA Region VI General CAFO Permit*, 10 AGRIC. UPDATE 4, 4 (May 1993).

70. 40 C.F.R. § 122.23(b)(i).

71. *Id.*

72. *Id.* § 122.23(c).

73. *Id.* § 122.23(b)(i).

74. *Id.* § 122, app. B.

man-made conveyance, although courts have generally interpreted the concept broadly. Section 122, appendix B, provides conversion factors for determining the number of animal units for various species based on a factor of 1.0 animal units per head of slaughter and feeder cattle.[75] Alternatively, under appropriate circumstances, the EPA may designate any animal feeding operation as a CAFO regardless of the number of animals confined, if the facility represents a significant source of pollution to the waters of the United States.[76]

Poultry operations, however, represent a special case. Two categories of laying hen and broiler waste management systems are listed in the regulation.[77] Neither, however, adequately describes the most common method of waste disposal by poultry producers—the dumping of dry poultry litter and combined manure on agricultural land. As a result, poultry producers have often circumvented CAFO designation by the EPA and the delegated states. A September 1993 EPA draft guidance for interpreting CAFO regulations provided, however, that animal feeding operations, including poultry operations, that remove waste from pens and stack it in areas exposed to rainfall or an adjacent watercourse may have established a crude liquid manure system for process wastewater that may discharge pollutants, and therefore would be subject to the CAFO regulations.

EPA CAFO regulations contain an important exception that tends to muddle the CAFO permitting analysis: no animal feeding operation is a CAFO if the operation only discharges during a 25-year, 24-hour storm event, i.e., a statistically calculated maximum 24-hour rainfall with a probable recurrence once every 25 years.[78] In contrast to most industrial and municipal point sources of pollution that treat and discharge effluent under NPDES permits, CAFOs are subject to a "no discharge" effluent limitation.[79] This provision allows permitted CAFOs to discharge only during a "chronic or catastrophic" rainfall event that exceeds the capacity of a structure designed to contain runoff during a 25-year, 24-hour storm event as well as process generated waste water, for example, water used in a milking parlor.[80] Consequently, the best available technology, economically achievable, employed by most CAFOs to satisfy the no discharge effluent limitation consists of one or more large lagoons or holding ponds to capture storm runoff and process generated waste water. An animal feeding operation that otherwise qualifies as a CAFO need not, however, obtain an NPDES permit if the operation can guarantee "no discharge" absent a 25-year, 24-hour storm event.[81] This option is unavailable to industrial point sources whose permits designate the quantity and quality of effluent discharged.

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75. *Id.*
76. *Id.* § 123.23.
77. *Id.*
78. *Id.* §§ 122, app. B; 412.11.
79. *Id.* § 412.13.
80. *Id.*
81. *Id.* § 122, app. B.

The decision by a large animal feeding operation to forego the NPDES permitting process does entail significant risk. In *Carr v. Alta Verde Industries*,[82] a CWA citizen suit alleged illegal discharge by an unpermitted 20,000-30,000 head cattle feedlot in Texas.[83] Runoff from the feedlot was captured in a series of six wastewater lagoons and subsequently used to irrigate adjacent fields.[84] From April to June 1987, heavy rains exceeded the capacity of the lagoons, causing feedlot workers to cut a spillway into the side of one of the lagoons.[85] The resulting outflow reached a nearby creek.[86] The trial court dismissed the suit for lack of standing; however, the Fifth Circuit reversed.[87] At no time did the rainfall during the period in question constitute a 25-year, 24-hour storm event; thus the exception did not apply.[88] Further, the feedlot clearly qualified as a CAFO under the size criteria.[89] Consequently, the feedlot was a CAFO point source that discharged without a permit and was therefore in violation of the CWA.[90]

The potential peril for operators of livestock production facilities operating without an NPDES permit is inadequate to spur all operators to obtain a permit. The authors are aware of at least one local dairy operator who has not obtained an NPDES permit in the belief that the facility can contain all wastewater absent a 25-year, 24-hour storm event. Unfortunately, several weeks of intense rain that fail to qualify as a 25-year, 24-hour storm event could prove this operator's undoing to be true.

B. *EPA Region VI General CAFO Permit and CWA Jurisdiction over Manure Application Fields*

EPA Region VI, headquartered in Dallas, covers Texas, Oklahoma, New Mexico, Arkansas, and Louisiana.[91] Arkansas is the only state in the region which has delegated NPDES authority by the EPA.[92] The region includes many large livestock production operations that have functioned without the required NPDES permit since the mid-1970s. This situation persisted due to the relatively low priority the EPA afforded CAFO permitting. State water quality assessments from the region reveal that a significant number of water bodies are now impaired by livestock waste.[93] Consequently, in February 1993, Region VI published a general NPDES permit for CAFOs.[94] The per-

82. Carr v. Alta Verde Indus., 931 F.2d 1055 (5th Cir. 1991).
83. *Id.* at 1057-58.
84. *Id.* at 1057.
85. *Id.*
86. *Id.* at 1058.
87. *Id.* at 1066.
88. *Id.* at 1060.
89. *Id.* at 1059
90. *Id.* at 1060.
91. *See* Frarey, *supra* note 69, at 4.
92. *Id.*
93. *Id.*
94. 58 Fed. Reg. 7610 (1993).

mit covers all of the states in the region except Arkansas.[95] These states joined Arizona, Idaho, and South Dakota as those covered by a general CAFO permit. By applying uniform management criteria to hundreds of operations, the general CAFO permit provides the EPA an effective way to require broad compliance within a relatively brief time.

The general permit requires CAFOs to develop a detailed pollution prevention plan and retain the plan on site.[96] CAFOs with over 1,000 animal units were required to implement the plan within one year from the issuance date of the permit; those with 300 to 1,000 animal units are provided two years for plan implementation.[97] The plan must include information concerning the construction and maintenance of facility waste containment structures.[98] Operators must document the capacity of containment structures, design standards for structural embankments, liner certification for containment structures, and dewatering schedules to insure adequate storage capacity, termed freeboard.[99] A permanent freeboard marker must exist in every containment structure to allow immediate observation of containment capacity by inspection personnel.[100] A rain gauge is also required on each site. The permit also lists mandatory best management practices for the application of solid and liquid manure to designated agricultural fields, including application only at agronomic rates and on thawed and unsaturated soil. Agronomic rates describe the capacity of crops or pasture grass to utilize the readily available nitrogen or phosphorus present in the manure applied. Notably, the permit allows manure land application to exceed agronomic rates "[w]here land application sites are isolated from surface waters and no potential exists for runoff to reach a water of the U.S."[101] This provision appears to represent a potential risk to groundwater reserves in some areas.

One extremely important issue raised by the general permit concerns the enforceability of provisions prohibiting polluted runoff from manure application fields.[102] The permit provides that "land application of manure shall not cause a discharge of significant pollutants to waters of the United States or cause a water quality violation in waters of the United States."[103] A similar prohibition specifically addresses lagoon effluent.[104] The CWA, however, only prohibits pollutant discharges from a point source.[105] By definition, a CAFO includes only those areas of a livestock production facility where animals are confined and crops or grasses cannot be maintained.[106]

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95. *Id.* at 7613.
96. *Id.* at 7610.
97. *Id.* at 7614, 7630.
98. *Id.* at 7632.
99. *Id.* at 7630.
100. *Id.* at 7631.
101. *Id.* at 7611.
102. *See* Frarey, *supra* note 69, at 4.
103. *Id.*
104. *Id.*
105. *Id.*
106. *Id.* at 5.

Thus, manure application fields may not fall within NPDES control.[107] Yet, if manure application fields fall outside the purview of the CWA, the no discharge effluent limitation applying to CAFOs may readily degenerate into deferred discharge.

The case of *Concerned Area Residents for the Environment v. Southview Farm*,[108] recently addressed the status of manure application fields and ruled that direct runoff from the fields violates the CWA. The case involved a suit by neighbors of a 2,000-head dairy located in Wyoming County in western New York state.[109] Plaintiffs' complaint sought over $4 million in damages for trespass, nuisance, negligence, and violations of the CWA.[110] The jury awarded plaintiffs a total of $4,101 on the trespass claim for contamination of plaintiffs' wells, and also found defendants in violation of the CWA on five occasions.[111] The trial court then overturned the jury's findings. On September 2, 1994, the United States Second Circuit Court of Appeals reviewed the case.[112] The court held that "the liquid manure spreading operations are a point source within the meaning of CWA section 1362(14) because the farm itself falls within the definition of a concentrated animal feeding operation."[113]

The *Southview Farm* opinion has generated considerable comment from the agricultural community, with some commentators suggesting that all agricultural fields are now destined for point source designation and federal regulation.[114] While *Southview Farm* represents a clear prohibition against direct discharge from manure application fields, the case affirms the notion that storm discharge from fields falls outside the purview of the Clean Water Act.[115] Polluted storm runoff from manure application fields remains a significant problem in many watersheds where intensive livestock production occurs.[116] Given the random nature of storm events and resulting field runoff, innovative environmental compliance strategies must be developed to ensure that livestock producers in these targeted areas adopt and maintain best manure management practices that will prevent excessive pollution during storm events.[117]

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107. *Id.*

108. Concerned Area Residents for the Env't v. Southview Farm, 34 F.3d 114 (2d Cir. 1994).

109. *Id.* at 115-116.

110. *Id.* at 115.

111. *Id.* at 116.

112. *Id.* at 115.

113. *Id.*

114. Lorraine Stuart Merrill, *New York Case Reversal Raises Regulatory Concerns*, HOARD'S DAIRYMAN, Jan. 10, 1995, at 9.

115. Larry Frarey et al., *The 2d Circuit's Southview Farm Decision Represents a Reasonable Approach to the Regulatory Treatment of Liquid Manure Disposal Practices of Livestock Farms*, NAT'L L.J., Mar. 6, 1995, at B5.

116. *Id.*

117. *Id.*

Initially, defendants argued that the runoff from manure application fields "was not a point source discharge because the liquid simply and quite naturally flowed to and through the lowest areas of the field, and that the pollutants reached the stream that flows into the Genesee 'in too diffuse a manner to create a point source discharge.' " [118] The Second Circuit held that the five point source discharges occurred in at least two ways.[119] First, the pipe, swale, and ditch collecting the liquid effluent at the base of the manure application field and directing it into a nearby stream comprised point sources under the Clean Water Act definition.[120] Second, the liquid manure spreading vehicles were point sources.[121] The court cited several cases as precedent for these conclusions.[122]

In rejecting the trial court's conclusion that two of the violations fell outside the purview of the Clean Water Act due to the "agricultural stormwater discharge" exception, the appeals court stated, "[w]e agree that agricultural stormwater run-off has always been considered nonpoint-source pollution exempt from the Act."[123] Nonetheless, the Second Circuit concluded that the discharges in question were not caused by precipitation but simply occurred on days when it rained: "We think the jury could properly find that the run-off was primarily caused by the over-saturation of the fields rather than the rain and that sufficient quantities of manure were present so that the run-off could not be classified as 'stormwater.' " [124] Only where rain causes the discharge to occur will the court characterize the event as a nonpoint source and exempt it from the Act.

Polluted storm discharge likely represents a more common phenomenon and difficult problem to remedy than the direct discharge at issue in *Southview Farm*. In addition to the great number of manure application fields that exist, storm events are random and stochastic. Such variability requires that storm runoff from manure application fields be treated like polluted agricultural runoff from cropland, pasture, and other agricultural lands.[125]

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118. Concerned Area Residents for the Env't v. Southview Farm, 34 F.3d at 118.

119. *Id.*

120. *Id.*

121. *Id.* at 119.

122. *Id.* at 118-19. *See, e.g.*, Sierra Club v. Abston Constr. Co., 620 F.2d 41, 45-46 (5th Cir. 1980) (strip mining debris placed in highly erodible piles carried away by rain water through naturally created ditches amounted to point source); United States v. Tull, 615 F. Supp. 610, 622 (E.D. Va. 1983) (bulldozers and dump trucks amounted to point sources), *aff'd*, 769 F.2d 182 (4th Cir. 1985); United States v. Weisman, 489 F. Supp. 1331, 1337 (M.D. Fla. 1980) (bulldozers and dump trucks amounted to point sources); Avoyelles Sportsmen's League v. Alexander, 473 F. Supp. 525, 532 (W.D. La. 1979) (landclearing equipment, ditch excavation equipment are point sources).

123. Concerned Area Residents for the Env't v. Southview Farm, 34 F.3d at 120. (The Clean Water Act's definition of point source specifically excludes agricultural stormwater discharges and return flows from irrigated agriculture.).

124. *Id.* at 121.

125. Frarey et. al., *supra* note 115, at B8.

> Since the inception of the present CWA (Clean Water Act) regulatory framework in 1972, Congress and EPA have recognized the futility of attempting to impose command-and-control regulation on several hundred million acres of farmland across the country. Consequently, Congress initially called for area-wide waste treatment planning under Sec. 208 of the act to control polluted storm runoff. For a variety of reasons, that process proved largely unsuccessful. In 1987, Congress enacted Sec. 319 to reaffirm the nation's commitment to non-point source pollution control. Absent some enforcement mechanism, however, to induce all agricultural producers and other sources of polluted runoff in targeted areas to adopt appropriate management measures, Sec. 319 perpetuates the shortcomings of Sec. 208.[126]

In 1987, Congress included the agricultural stormwater discharge exception to the definition of point source in the Act to underscore the inappropriateness of applying a regulatory regime to millions of acres of farmland.[127] The previous definition was designed to control discrete, readily identified industrial, and municipal discharge points.[128]

C. *State Regulation of Livestock Production Operations*

The regulation of livestock production operations by individual states has been inconsistent, even among the thirty-nine states to which the EPA has delegated NPDES CAFO permitting authority.[129] In 1993, the authors surveyed state agencies charged with regulating waste discharge by livestock operations in nine of the top ten milk producing states: California, Wisconsin, New York, Minnesota, Pennsylvania, Michigan, Ohio, Washington, and Iowa.[130] Table 1 includes information on the criteria used for issuing a CAFO permit, the approximate number of CAFO permits issued by the agencies, whether a public hearing precedes permit issuance, and whether and how often a permitted facility is inspected. TIAER compiled this data in August of 1993 and updated it in August of 1995.[131]

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126. *Id.*
127. 33 U.S.C. § 1362(14).
128. *Id.*
129. LARRY FRAREY & RON JONES, DIMENSIONS OF PLANNED INTERVENTION 14 (1994).
130. *Id.* at 15.
131. *Id.* at 14.

TABLE 1
Permitting of CAFOs by State

STATE	PERMITS ISSUED	PERMITTING CRITERIA	NUMBER OF PERMITS ISSUED	PUBLIC HEARING	POST-PERMIT INSPECTION
Wisconsin	Yes	>1000 AU	50	Yes	Yes
California	Yes	Regulate all	650	Yes	Yes
New York	Yes	>1000 AU	Unknown	Yes	No
Minnesota	Yes	10 AU	17,000[a]	No[b]	Complaint basis
Pennsylvania	No	N/A	N/A	N/A	N/A
Michigan	No	N/A	N/A	N/A	N/A
Ohio	Yes	>1000 AU	50 construction permits	Yes	Yes
Washington	Yes	Known pollution problems	16	Yes	Yes
Iowa	Yes	>1000 AU	150 construction permits annually	No	Complaint basis
Texas	Yes	>200 dairy cattle	Unknown	Yes[c]	Yes[d]

N/A = Not Applicable
AU = Animal Units
a. Minnesota issues certificates of compliance for feedlots with ten or more animal units.
b. Public hearings may be held if an Environmental Impact Statement is needed.
c. Public hearings are only held in very limited circumstances.
d. Routine inspections are being conducted in Dairy Outreach Program Areas (Comanche, Erath, and Hopkins counties).

All of the surveyed states have been delegated NPDES authority by the EPA. Even as late as 1993, respondents from New York, Minnesota, and Pennsylvania indicated that a no discharge effluent limitation generally receives little enforcement.[132] All respondents indicated that runoff from manure application fields represent a significant water quality problem within their states.[133] Notably, the survey also revealed that neither Pennsylvania nor Michigan issue permits to livestock production operations, despite NPDES delegation from the EPA.[134] A Nutrient Management law recently passed in Pennsylvania does, however, require even small farms raising livestock to develop and implement a nutrient management plan.[135]

In contrast to the surveyed states, Texas has not received NPDES delegation from the EPA.[136] Consequently, operators of large livestock production facilities in Texas must obtain discharge permits from both the Texas Natural Resource Conservation Commission (TNRCC) and EPA Region VI.[137] Such duplication of effort increases operators' costs and has spurred renewed efforts in the Texas Legislature to remedy existing impediments to NPDES delegation.[138] Nonetheless, Texas regulations covering CAFOs are among the most stringent in the country. For example, operators of dairy operations with 200 milking head or more must obtain a waste discharge permit from TNRCC.[139] Dairy expansion in the upper North Bosque River watershed area in North Central Texas has been the driving force behind development and enforcement of regulations for the Texas livestock production industry, as well as the publication of the EPA Region VI General CAFO Permit.[140]

D. *Enforcement of Agricultural Pollution Laws in the United States*

Fundamental problems with inspection and enforcement still remain. The presence of point source control structures such as lagoons, diversions, and lagoon markers may be readily observed through site inspection. Manure application practices are, however, behavioral in nature, and proper behavior is difficult to enforce across a vast watershed. Livestock production operations generally utilize several manure application fields. The average dairy in the upper North Bosque River watershed includes four.[141] "Thus, approximately 400 application fields exist on the watershed's 100 dairies,

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132. Frarey & Pratt, *supra* note 48, at 12.

133. *Id.*

134. *Id.*

135. *Id.*; *see* PA. STAT. ANN. tit. 3, § 1706 (West 1997).

136. Frarey & Pratt, *supra* note 48, at 12.

137. *Id.*

138. *Id.*; *see* Texas S. Res. 1047, 74th Leg., 2d Sess. (Tex. 1995); 20 Tex. Reg. 4659, 4727 (June 30, 1995); 30 TEX. ADMIN. CODE § 321.181-.198 (West 1996).

139. TEX. ADMIN. CODE § 321.184.

140. Frarey & Pratt, *supra* note 48, at 12.

141. *Id.*