Unsafe Sewage Sludge or Beneficial Biosolids?: Liability, Planning, and Management Issues Regarding the Land Application of Sewage Treatment Residuals

William Goldfarb
Uta Krogmann
Christopher Hopkins

Follow this and additional works at: http://lawdigitalcommons.bc.edu/ealr
Part of the Environmental Law Commons

Recommended Citation
Commentators have identified fear of liability as a major deterrent to the widespread land application of sewage sludge. Liability issues regarding land application include not only legal liability, but also market liability as a result of negative public perceptions of the land application of sewage sludge. Under current law, municipal sewage treatment facilities, landowners, farmers, and even lenders are potentially liable for risks arising from sewage sludge application, unless someone else assumes the risk through a clear and legally enforceable mechanism. This article introduces this complex, evolving, and contentious environmental issue. It investigates the various siting and toxic tort liability issues associated with the land application of sewage sludge, and explores some of the risk-sharing mechanisms developed to minimize the liabilities associated with the application of sewage sludge to farmland. It concludes with a recommendation for a

* William Goldfarb is a Professor of Environmental Law in the Department of Environmental Sciences, Cook College, Rutgers, The State University of New Jersey, New Brunswick, New Jersey. Any opinions expressed in this article are solely those of the authors, and do not necessarily represent the opinions or positions of the universities or agencies that either employ them or that have provided funding for this study. The authors would like to express their appreciation to the Northeast Regional Center for Rural Development and the New Jersey Agricultural Experiment Station for providing partial funding for this study.

** Uta Krogmann is an Assistant Professor in the Department of Environmental Sciences, Cook College, Rutgers, The State University of New Jersey, New Brunswick, New Jersey, and an Assistant Extension Specialist for solid waste management in Cooperative Extension at Rutgers University.

*** Christopher Hopkins received his Bachelor of Science degree from Cook College, Rutgers University, and his Juris Doctor from Boston College Law School.
public indemnification fund to compensate for losses caused by land application of sewage sludge.

INTRODUCTION

Publicly Owned Treatment Works (POTWs) treat sewage at approximately 16,000 treatment facilities across the nation.\(^1\) Sewage sludge is the residual solid, semi-solid, or high-solid content liquid material remaining after treated municipal wastewater is discharged into local waterbodies.\(^2\) Before these residuals can be used on agricultural or nonagricultural land, or be sold to homeowners for garden use, sewage sludge must undergo additional treatment to stabilize and disinfect it.

There has been an ongoing and heated discussion about whether to call these residuals "sewage sludge" or "biosolids."\(^3\) This debate is a reflection of the larger controversy regarding the environmental impacts of this material. While the original term "sewage sludge" indicates a mudlike deposit originating from sewage,\(^4\) "biosolids" refers to the potential beneficial properties of this recyclable resource.\(^5\) In this article, the original term "sewage sludge" is used, since the definition of the term "biosolids" varies with the context in which it is used.\(^6\)

---

4 See RANDOM HOUSE, WEBSTER'S COLLEGE DICTIONARY 1262 (1992) (sludge—noun, term in use since 1640–1650, "1. mud, mire, or ooze; slush. 2. a deposit of ooze at the bottom of a body of water. 3. Any of various mudlike deposits or mixtures. 4. broken ice, as on the sea. 5. sediment deposited during the treatment of sewage.").
5 See MERRIAM, WEBSTER'S COLLEGIATE DICTIONARY (10th ed. 1998) ("biosolid—noun, term in use since 1977, solid organic matter recovered from a sewage treatment process especially as fertilizer, usually used in plural.").
6 The EPA uses the term "sewage sludge" in its regulations but has replaced this term with "biosolids" in its guidance documents. See U.S. ENVTL. PROTECTION AGENCY, No. EPA/832/R-93/003, A PLAIN ENGLISH GUIDE TO THE EPA PART 503 BIOSOLIDS RULE 1 (1994) [hereinafter PLAIN ENGLISH GUIDE]. The Water Environment Federation, a technical and educational organization of more than 41,000 water quality professionals and specialists, uses the term "biosolids" to refer to sewage sludge that is stabilized and disinfected for beneficial use. See WATER ENVIRONMENT FEDERATION TASK FORCE ON WASTEWATER RESIDUALS STABILIZATION, WASTEWATER RESIDUALS STABILIZATION 1 (1996). The Potash & Phosphate Institute
In 1995, about 6.4 million dry tons of sewage sludge were produced in the nation's POTWs.\textsuperscript{7} With the construction of additional POTWs and improvements in wastewater treatment, this number will certainly continue to rise. The disposal options for this waste byproduct of modern sewage treatment methods are continuing to narrow, albeit at a slower pace due to the increased number of land application sites and mega-landfills. This narrowing of disposal options began when President Ronald Reagan signed into law the federal Ocean Dumping Ban Act on November 18, 1988, making it illegal to dump sludge into the ocean after December 31, 1991.\textsuperscript{8} Dumpers unable to meet the deadline faced a series of increasing fines and penalties. At that time, nine municipalities in New York and New Jersey were dumping sludge into the ocean.\textsuperscript{9} The enactment of the Ocean Dumping Ban Act prompted what was called the "sludge war" in Congress, as representatives from New York, New Jersey, and other East Coast states grappled with the phaseout of ocean dumping.\textsuperscript{10} When the U.S. Environmental Protection Agency (EPA or the Agency) banned the use of the twelve-mile New York Bight dump sight and forced sludge dumping to 106 miles offshore, New York and New Jersey were forced to compromise in September 1992.\textsuperscript{11} The new agreement included penalty and fee provisions for those still dumping, and stipulated that penalty and fee moneys were to be placed in a trust, to fund research on alternative disposal methods.\textsuperscript{12} New York City, in January 1993, became the last municipality to halt its ocean dumping practices, and thus ended ocean sewage sludge disposal.\textsuperscript{13} Mounting environmental
and economic pressures forced policy and decisionmakers to examine viable disposal alternatives for our nation's sewage sludge.

Section I of this article discusses the various sewage sludge stabilization and disposal options available. Section II provides the rich and controversial regulatory history of sewage sludge, and Section III reviews the siting issues that have arisen surrounding the land application of sewage sludge. Section IV explores the possible legal issues associated with siting sewage sludge land application projects. The remaining sections address possible toxic tort liability of sludge management actors. Potential common law and statutory liability is discussed and several risk-sharing mechanisms are examined. A recommendation for dealing with liability management is then offered.

I. SEWAGE SLUDGE STABILIZATION AND DISPOSAL OPTIONS

There are three main disposal alternatives for sewage sludge: (1) landfilling; (2) incineration; and (3) land application.14 Before being applied to land, sewage sludge must be stabilized and disinfected to reduce pathogens, the attraction of vectors (disease transmitting organisms like flies and rodents), and the potential to emit odors.15 The same is true for landfilling unless the sewage sludge in the landfill is covered daily.16 Also, since some biological stabilization and disinfection methods also reduce the volume of sewage sludge that must be disposed, sewage sludge is sometimes stabilized before being incinerated.17

A. Sewage Sludge Stabilization and Disinfection

During stabilization and disinfection, pathogens are either significantly reduced (Class B) or reduced below detectable levels (Class A).18 Class A treatment methods can be compared with pasteurization of milk or cooking of foods, where high temperatures significantly reduce or kill pathogens in order to prevent the risk of disease transmission.19 Class B stabilization methods reduce pathogens to higher

---

15 See id. at 9337–38.
16 See id. at 9346.
17 See Ravenscroft, supra note 13, at 15.
18 See Standards for the Use or Disposal of Sewage Sludge, 40 C.F.R § 503.32 (1998).
levels than Class A stabilization, so site and crop restrictions are still necessary. Site and crop restrictions for Class B sewage sludge keep potential pathogens from human contact until environmental conditions, like sunlight, lower the pathogen density in the sludge so that pathogens are no longer a risk. Major stabilization methods include anaerobic digestion, aerobic digestion, lime stabilization, composting, advanced alkaline stabilization, and heat drying. The characteristics of the different end products and the levels of pathogen reduction are summarized in Table 1 of the Appendix.

1. Anaerobic Digestion, Aerobic Digestion, Lime Stabilization

Anaerobic digestion, aerobic digestion, and lime stabilization are the most common methods of sewage sludge stabilization. While anaerobic and aerobic digestion are biological methods, lime stabilization is a chemical method. Lime stabilization is a very simple and inexpensive method, where lime is added to the sewage sludge to raise the pH of the sewage sludge to twelve after two hours of contact. Both aerobic and anaerobic digestion reduce the volume of sewage sludge solids that require disposal. Another benefit of anaerobic digestion is the generation of methane, which can be used as an energy source. Anaerobic digestion is only economical for larger communities due to the high capital costs involved. Aerobic digestion, an energy-intensive process, is typically found at smaller POTWs. However, all three methods—anaerobic digestion, aerobic digestion, and lime stabilization—produce in most cases only a Class B sewage sludge. Since the use of Class B sewage sludge is more stringently regulated than Class A sewage sludge, there is an increasing interest in Class A stabilization methods, such as composting, alkaline stabilization, and heat drying.

2. Composting

Projects for composting sewage sludge, or co-composting with municipal solid waste (MSW), or yard waste, have increased in recent years. In 1998, there were 321 sewage sludge composting projects operating around the country. Composting is used mostly by com-

---

21 See 40 C.F.R. § 503.48.
munies that produce relatively low volumes of sewage sludge,\textsuperscript{23} and is often limited by the lack of long-term markets for the finished compost. The stigma attached to sewage sludge and sludge-derived products, stemming from public concern over potential increased concentrations of pollutants in soils and the resulting possible adverse environmental effects, continues to be the major obstacle to finding markets for compost.\textsuperscript{24} Furthermore, composting can be expensive and uncontrolled odors can expose sites to potential nuisance liability.\textsuperscript{25} In order to reduce nuisance liability, odor treatment at composting sites has improved substantially in recent years.\textsuperscript{26}

3. Advanced Alkaline Stabilization

Advanced alkaline stabilization neutralizes harmful pathogens in the sewage sludge by adding liming agents to increase pH above twelve for at least seventy-two hours, with temperatures held above fifty-two degrees Celsius for at least twelve hours during this period.\textsuperscript{27} Quick lime, hydrated lime, or cement kiln dust are added to solidify the material, and the product has been used as a liming agent in agriculture or as daily cover and capping material at MSW landfills.\textsuperscript{28} Cases of public nuisances arising from the odor of this material have been reported.\textsuperscript{29} In addition, cement kiln dust itself may be contaminated because cement kilns sometimes burn hazardous wastes.\textsuperscript{30}

\textsuperscript{23} See Ravenscroft, \textit{supra} note 13, at 5.
\textsuperscript{24} A bill was introduced in the New York State Legislature requiring that all fruits and vegetables grown with sewage sludge-derived-products be labeled. \textit{See Legislation Would Require Labeling of Food Grown on Sludge Fertilized Land, 28 Env't Rep. (BNA) 485, 485 (July 11, 1997).} A sewage sludge-derived- product is sewage sludge that has been treated and then altered, either physically or chemically, to be put into a form that can be marketed to the general public. Some of these products are advanced alkaline stabilized sewage sludge, composted sewage sludge and pelletized sewage sludge. \textit{See Biosolids Working Group of Rutgers Cooperative Extension, Guidelines for Land Application of Sewage Sludge in Agriculture (Oct. 1998) (unpublished draft on file with authors).}
\textsuperscript{25} For example, a 192-acre landfill in West Virginia in which large amounts of sewage sludge imported from other states were converted to compost was held to be a public nuisance and ordered closed. \textit{See West Virginia Landfill Ordered Closed Because of Failure By Owner to Control Odor, 27 Env't Rep. (BNA) 896, 896 (Aug. 16, 1996).}
\textsuperscript{26} See Goldstein & Gray, \textit{supra} note 22, at 74.
\textsuperscript{27} See Ravenscroft, \textit{supra} note 13, at 5.
\textsuperscript{28} See \textit{id.} at 5, 15.
\textsuperscript{29} See \textit{id.} at 15.
\textsuperscript{30} Cement kiln dust is a controversial hazardous waste and its generators are regulated under RCRA. \textit{See Regulatory Determination—Cement Kiln Dust, 43 Env't Rep. (BNA) 1705 (Jan. 10, 1997).}
4. Heat Drying

Another stabilization technique is the heat drying of sewage sludge. Heat drying technology can be used for sewage sludge stabilization in two ways. In the first method, dryers are sometimes used, after dewatering sewage sludge in presses or centrifuges, as a single process to reduce the weight and volume of the sludge so that it may be transported for disposal. In the second method, heat drying is also used as part of a process to create a usable end product that flows easily and can be used in fertilizer mixes. This pelletizing process uses heat to dry the sewage sludge to between ninety and ninety-five percent solids, thus reducing volume and killing pathogens before the sewage sludge is turned into pellets and sold as fertilizer. Heat drying is most often performed by private companies, which sometimes add nitrogen to increase the fertilizing value of the sewage sludge. One significant drawback to this process is that the drying uses a substantial amount of energy. For example, dryers employed to dry ten tons per day will use 10,000 to 20,000 cubic feet of gas per hour.

B. Landfilling

In 1995, about twenty-five percent of sewage sludge in the United States was landfilled by co-disposal with MSW, by disposal in sludge monofills, or by use as landfill cover in MSW landfills. In a few states, this amount was much higher (e.g., Nevada—75%; New Mexico—73%; Rhode Island—60%; Louisiana—45%). In the 1980s and early 1990s, the number of available landfills decreased. Based on the tighter supply of landfill space and greater recognition of the beneficial properties of sewage sludge, a few states, including New Jersey, enacted legislation banning or limiting the amount of sewage sludge that could be disposed of in landfills. Currently, however, because of the increase in the number of so-called mega-landfills, landfill space is

---

31 See Ravenscroft, supra note 13, at 5.
32 See id.
33 See id.
34 See id. at 5, 15.
35 See id. at 5.
36 See Edgar et al., supra note 7, at 484, 492.
37 See id. at 486–88.
abundant. So for some communities, the landfilling of sewage sludge is the least expensive alternative. Additionally, the increased interest in bioreactor landfills contributes to this trend, since the addition of sewage sludge as inoculum in bioreactor landfills is a potential benefit. In bioreactor landfills, the decomposition of waste is controlled within the landfill environment, which lowers long-term risks to humans and the environment from the landfill gas and leachate. In contrast, central European countries have either already banned or soon will ban the landfill disposal of wastes with a high organic matter content, like sewage sludge and MSW. This is in order to minimize the long-term risks of landfills.

C. Incineration

About sixteen percent of municipal sewage sludge is combusted in the United States. The most prominent advantage of this disposal method is the destruction of organic pollutants and the reduction in total volume of sewage sludge. The volume reduction can translate into reduced transportation costs. However, these cost reductions will most likely be offset by rising facility capital and operating costs driven by public concern over air emissions and ash residue disposal, coupled with tightening federal regulation of particulate emissions. Thus, combustion is usually a very costly alternative. However, incineration and land application are increasingly used in central European countries where landfilling of sewage sludge is or will soon be banned.

D. Land Application

Land application can be defined as the use of sewage sludge or sludge-derived products, like compost, alkaline stabilized materials, and pellets, on agricultural land, nonagricultural land (forests, recla-
mation sites, parks, etc.), and in home gardens. For use in home gardens, composts or pellets are distributed and marketed in bags or containers. EPA has increased its emphasis on land application of sewage sludge as a beneficial use because this option closes the natural nutrient cycle; moreover, land application is often the cheapest disposal option.[^48] Land application represents the most common method of sludge management in the United States.[^49] Since 1988, land application of sewage sludge has increased from thirty-three percent of all sewage sludge generated to fifty-nine percent today.[^50] One of the reasons for this increase is the comparative deregulation of land application of sewage sludge.[^51]

Sewage sludge contains a significant organic matter content, and also contains micro- and macronutrients essential for plant growth. Micronutrients required by plants to remain healthy, such as zinc, chromium, iron, and copper, are usually not found in significant quantities in commercial fertilizers.[^52] Sewage sludge, or sewage sludge-derived products, can be used as sources of micronutrients, liming materials, or as soil amendments (Table 1 of the Appendix). Methods of application depend on the physical characteristics of the sewage sludge and the receiving soil and on the type of crops grown. Liquid sewage sludge may be applied with tractors, tank wagons, irrigation systems, and special application vehicles, as well as by injection under the surface layer of the soil. On the other hand, dewatered sewage sludge, compost, alkaline stabilized sewage sludge, and pelletized sewage sludge may be applied in the same manner as chemical fertilizers or animal manure.[^53] A striking example of land application occurred when the major floods of 1993 dumped tons of sand on agricultural lands in the Greens Bottom flood plain in Missouri, making the land unsuitable for satisfactory crop yields. Sewage sludge was spread on 1500 acres in order to restore the organic matter that had washed away. Instead of having to wait the average five years for a significant crop yield, farmers in that region were able to grow productive crops in two years.[^54]

[^49]: See Ravenscroft, supra note 13, at 5.
[^50]: See Edgar et al., supra note 7, at 484, 492.
[^51]: See infra notes 147, 152 and accompanying text for a discussion on the regulatory history of the final Part 503 rule.
[^54]: See Jost, supra note 52, at 32.
Although land application of sewage sludge can substantially improve land productivity, and also represents a cheap and technologically viable option for many communities, it has limits and risks. Odors are the most annoying problem for neighbors of farmers who apply sewage sludge. In addition, if sewage sludge is improperly handled, pollutants (trace elements or persistent organic chemicals) and pathogens (viruses, bacteria, or parasites) in sewage sludge could potentially contaminate soils, crops, livestock, and even humans. For example, successive sewage sludge applications to land can result in an accumulation of heavy metals in the soil. This accumulation can potentially result in soil concentrations of metals that are toxic to plants, soil organisms, animals, and humans along the food chain. In a report assessing the risks of sewage sludge land application, EPA identified fourteen potential exposure pathways resulting from such land application:

1. Sewage sludge » Soil » Plant » Human (Consumer of plant products)
2. Sewage sludge » Soil » Plant » Human (Home gardener)
3. Sewage sludge » Human (Child eating sewage sludge)
4. Sewage sludge » Soil » Plant » Animal » Human
5. Sewage sludge » Soil » Animal » Human (Animals ingest sludge directly)
6. Sewage sludge » Soil » Plant » Animal
7. Sewage sludge » Soil » Animal
8. Sewage sludge » Soil » Plant
9. Sewage sludge » Soil » Soil organism
10. Sewage sludge » Soil » Soil organism » Soil organism predator
11. Sewage sludge » Soil » Airborne dust » Human
12. Sewage sludge » Soil » Surface water » Human
13. Sewage sludge » Soil » Air » Human
14. Sewage sludge » Soil » Ground water » Human

Pathway 3 (a child eating sewage sludge), pathway 6 (an animal over a lifetime of eating plants grown on sludge-applied soil), and pathway

56 See U.S. ENVTL. PROTECTION AGENCY, REP. NO. EPA832-B-93-005, A GUIDE TO THE
8 (plant phytotoxicity) were considered the most likely pathways in the EPA risk assessment.  
Due to the large number of potential contaminants in sewage sludge and the complexity of the contamination pathways just described, land application of sewage sludge has endured a tortured regulatory history.

II. REGULATORY HISTORY OF SEWAGE SLUDGE

A. Pretreatment Problems

The Clean Water Act (CWA), enacted in 1972 and significantly amended in 1977 and 1987, directs EPA to promulgate regulations establishing limits on the types and amounts of pollutants that can be legally discharged from various industrial, commercial, and public dischargers of wastewater. Congress recognized that regulating only those sources discharging effluent directly into waterbodies would not achieve the objectives of the CWA. Thus, the CWA also requires EPA to promulgate nationally applicable pretreatment standards, which restrict pollutant discharges from industries that indirectly discharge into waterbodies by discharging into sewers. Pretreatment standards are implemented in the first instance by POTWs, with states and EPA performing backup monitoring and enforcement roles. In addition to national pretreatment standards, POTWs are also required to implement more stringent local pretreatment standards applicable to their industrial indirect dischargers where necessary to meet water quality standards.

An indirect discharger gains a number of advantages from plugging into a POTW. First, because the indirect discharging industry is a customer of the POTW, which is the primary enforcement authority, the indirect discharger can expect more sympathetic monitoring and enforcement from the POTW than would a direct discharger from a state or federal permitting agency. Second, the Domestic Sewer...
Exclusion clause in the federal Resource Conservation and Recovery Act (RCRA) exempts any indirect industrial discharge into a sewer from RCRA's reporting, permitting, and treatment requirements (i.e., such a discharge is not considered a solid waste).\textsuperscript{62} Third, an indirect discharger is not required to have a National Pollutant Discharge Elimination System Permit (NPDES) under the CWA.\textsuperscript{63} The agreement between the indirect discharger and the POTW is incorporated into a local permit or contract that is often not subject to public participation or enforcement by citizen suits.\textsuperscript{64} Finally, indirect discharge is a distinct bargain:

Originally, an industrial user of a POTW . . . was required to repay a portion of the federal [construction] grant corresponding to its percentage use of the system's total capacity. "Industrial cost recovery" was intended to provide funds for reconstruction and repair, and to encourage an industry to choose the most cost effective solution to its wastewater treatment problems, whether it was indirect or direct discharge. After prolonged and concerted opposition from municipalities and sewerage authorities, industrial cost recovery was first suspended [administratively], then limited to large indirect dischargers, and finally repealed entirely. Thus, as the CWA now stands, there is a major federal subsidy for industries that "plug in" to POTWs, because they pay only user charges and therefore save on construction costs.\textsuperscript{65}

Because of the advantages presented to an indirect discharger, significant amounts of toxic materials are discharged into the nation's sewer systems each year.\textsuperscript{66}

B. The Regulation of Sewage Sludge

The CWA of 1977 amended section 465, which mandated only that EPA develop guidelines for the use and disposal of sewage sludge.\textsuperscript{67} Pursuant to the 1977 amendments, EPA was required to issue regulations that: (1) identify uses for sewage sludge, including disposal options; (2) specify factors to be taken into account in determining the

\textsuperscript{63} See Goldfarb, supra note 61, at 204.
\textsuperscript{64} Some states, such as New Jersey, require large indirect dischargers to procure Significant Industrial User (SIU) permits, which are subject to citizen scrutiny and enforcement. See id.
\textsuperscript{65} Id. at 199–200.
\textsuperscript{66} According to an EPA study, 178,000 metric tons of waste considered hazardous under RCRA were discharged into POTWs during 1986. See Controls Proposed on Hazardous Waste Discharged into Sewage Treatment Systems, 19 Env't Rep. (BNA) 1481, 1484 (Nov. 25, 1988).
\textsuperscript{67} See 33 U.S.C. § 1345.
measures and practices applicable to each use or disposal option; and (3) identify concentrations of pollutants which interfere with each such use or disposal option.68 Responding to this mandate, in 1979, EPA adopted guidelines for sewage sludge use and disposal when sewage sludge was applied to land or disposed of in landfills.69

Specific land application considerations provided interim criteria for the application of sewage sludges onto land utilized for food chain crops.70 For example, the regulations contained limitations on the permissible concentration of cadmium in sewage sludge, and included annual application rates that progressively declined over time in order to limit the cumulative loadings of cadmium.71 Limits were also established for PCBs, including the requirement that sewage sludge containing concentrations of PCBs equal to or greater than ten mg/kg was not to be incorporated into the soil on land used for producing animal feed, including pasture crops.72 The regulations also provided for different required levels of pathogen reduction, depending upon whether crops were intended for direct human consumption or for animals destined for human consumption.73

The federal regulations also contained guidelines for groundwater protection. Under section 3–4, a sewage sludge land-application facility may not contaminate an underground drinking water source.74 The regulations prohibit any use or disposal of sewage sludge that causes the concentrations of ten trace elements and six organic chemicals in an underground drinking water source to exceed maximum contaminant levels under the Safe Drinking Water Act.75

In 1982, in order to develop the comprehensive sewage sludge regulations promised in the preamble to the regulations in 40 C.F.R. part 257, EPA created an Intra-Agency Sludge Task Force.76 The Task Force recommended that the Agency develop an integrated,

---

68 See id. § 1345(d); Standards for the Use or Disposal of Sewage Sludge, 58 Fed. Reg. 9248, 9260 (1993).
69 These regulations were co-promulgated under Subtitle D of RCRA and section 405(d) of the CWA. They are found in 40 C.F.R. pt. 257.
71 See id.
73 See id.
74 See 40 C.F.R. § 257.3–4.
comprehensive regulatory structure for sewage sludge use and disposal. In 1985, EPA presented both its program for developing sewage sludge regulations and the recommendations of the task force at workshops held in various American cities.

Also in 1985, the Natural Resources Defense Council (NRDC) sued EPA based on the Agency's failure to include sewage sludge regulations in its Pretreatment Regulations (40 C.F.R. part 403). NRDC's goal was to force EPA to issue promptly sewage sludge regulations. The court ruled that EPA's pretreatment regulations were invalid, holding that "despite EPA's contention that sludge regulations are in place, EPA's device of incorporating other regulations [in its place] does not meet the statute's command for a comprehensive framework to regulate the disposal and utilization of sludge." Following this decision, some members of Congress became concerned that, without valid sewage sludge regulations, industrial dischargers would be unable to find sewage sludge management alternatives. Thus, in 1987, Congress reaffirmed its 1977 directive that EPA develop comprehensive sewage sludge regulations, setting forth a strict schedule for EPA to do so.

C. The 1989 Proposed 503 Sewage Sludge Standards

In response to the mandate reiterated by Congress, in 1989, EPA sought to regulate sewage sludge when it is: (1) applied to land for a beneficial purpose; (2) landfilled in sewage sludge monofills or disposed of in other surface disposal sites (such as stockpiles or impoundments); and (3) incinerated. EPA believed that beneficial reuse should be regulated differently for home gardens, agricultural land, and nonagricultural land (such as land reclamation sites, forest and range land, parks and golf courses). Thus, on February 6, 1989, EPA proposed sewage sludge standards in Part 503 Standards for the Disposal of Sewage Sludge.

---

80 Id. at 314.
81 See 58 Fed. Reg. at 9261.
82 See id.
84 See id.
1. Pollutants

The proposed rule was harm-based for the use of sewage sludge on agricultural land and for home gardening, dictating numerical criteria for these uses.\(^86\) The numerical criteria were generated by human health risk-based mathematical models that calculated maximum contaminant loading rates and the levels of exposure of the most exposed individuals (MEI) to various environmental pathways.\(^87\) EPA proposed maximum cumulative soil loading rates for ten trace elements (Table 2 in the Appendix) and annual soil loading rates for twelve organic compounds.\(^88\)

For nonagricultural land, the rule proposed limits for the same elements; however, the limits were not based on a risk assessment, but instead on the ninety-eighth percentile of the national sewage sludge quality data.\(^89\)

2. Pathogens and Vectors

With regard to pathogens, the proposed rule allowed for the land application of three sewage sludge classes designated A, B, and C. Only Class A sewage sludge was to be sold to the public for home gardening because this class contained pathogens below detectable levels.\(^90\) There were no use restrictions regarding pathogens for Class A sewage sludge.\(^91\) The proposed rule specified crop and access restrictions associated with the use of Class B and Class C sewage sludge.\(^92\)

For example, if Class B and C sewage sludge were applied to food crops whose harvested parts were totally above ground, those crops could not be grown again for a period of eighteen months after application.\(^93\) Food crops whose harvested parts were below ground could not be grown for a period of five years. Feed crops for animals could not be harvested for thirty days if Class B sewage sludge was applied,\(^94\)

---

\(^{86}\) See id. at 5880.
\(^{87}\) See id. at 5764–91.
\(^{88}\) The organic compounds subject to EPA regulation were: total aldrin and dieldrin; benzo(a)pyrene; chlordane; total DDT, DDD, DDE; dimethyl nitrosamine; heptachlor; hexachlorobenzene; hexachlorobutadiene; lindane; polychlorinated biphenyls, toxaphene; trichloroethylene. See id. at 5880.
\(^{89}\) See id. at 5806.
\(^{90}\) See 54 Fed. Reg. at 5888–89.
\(^{91}\) See id. at 5888.
\(^{92}\) See id. at 5889.
\(^{93}\) See id.
or sixty days if Class C sewage sludge was applied. No public access to the site was permitted for twelve months after the Class B or Class C sewage sludge was applied; however, agricultural workers were permitted access during those periods. Vector attraction reduction requirements were established as well.

3. Management Practices

Management practices for agricultural land were also required under the rule. Such management practices stipulated that sewage sludge must not be applied in excess of the nitrogen crop requirement or in excess of fifty metric tons/ha, and that land application sites must not be closer than ten meters to surface waters.

The same requirements (except for the rule against applications in excess of fifty metric tons/ha) were also applicable to sewage sludge use on nonagricultural land. In addition, growing food, feed crops, and grazing by animals was prohibited for five years after application. A vegetative cover also had to be established on the land.

The management practices for sewage sludge products for home gardens set forth labeling information. The labeling information required under the proposed rule included the nitrogen concentration, the concentrations of the nine trace elements and ten organic compounds, and the uses appropriate for each product.

4. Monitoring and Record-Keeping

EPA's 1989 proposed rule also set forth monitoring and record-keeping requirements. Some of the record-keeping requirements for agricultural land were: (1) the name and address of the user who applied the sewage sludge; (2) the concentration of nitrogen and pollutants in the sewage sludge; (3) the results of monitoring of the sewage sludge to determine compliance with pathogen reduction requirements and vector attraction reduction requirements; (4) records to indicate whether sewage sludge was sub-surface injected to comply with the vector attraction reduction requirement; (5) the contract between the POTW and the user of the sewage sludge; (6) certifica-
tion that the user was informed about the access and use restrictions for the land when either a Class B or a Class C sewage sludge was applied; (7) certification that there were at least ten meters between the sewage sludge-treated land and any surface water boundary; and (8) certification that the land was in compliance with the general requirements of the section.100

D. Public Response to the Proposed Sewage Sludge Standards

EPA received over 3000 pages of written comments from more than 500 municipal sewage sludge generators, local regulatory agencies, environmental consultants, lobbying organizations, and private citizens.101 Sewage sludge experts immediately criticized the proposed rule as technically flawed, citing EPA's failure to conduct adequate peer review before releasing its proposal.102 Comments from municipalities uniformly expressed shock at the highly conservative approach of EPA, which the municipalities believed would produce extremely restrictive numerical criteria for sewage sludge management.103 Many believed that the new sludge regulations ran counter to EPA's policy of encouraging beneficial reuse and that several facilities, which EPA formerly had recognized as model reuse facilities, would be closed down or forced away from reuse and land application to more expensive methods of treatment, such as landfilling or incineration.104 Most commentors felt that EPA had utilized unrealistic assumptions in its supporting data (i.e., the pollutant concentrations in the sewage sludge and the amount of time it takes for a pollutant to accumulate in soils).105 The EPA-sponsored technical Peer Review Committee (PRC) was also highly critical of EPA's risk assessment methodology.106 The PRC criticized EPA for not keeping policy separate from the scientific basis of the risk assessment. The PRC also charged that EPA had introduced unnecessarily wide margins of safety throughout the risk assessment by making overly conservative data selections and assumptions about the MEIs.107

100 See 54 Fed. Reg. at 5896.
101 See LUE-HING ET AL., supra note 76, at 39.
103 See 58 Fed. Reg. at 9267.
104 See LUE-HING ET AL., supra note 76, at 39.
106 See LUE-HING ET AL., supra note 76, at 43.
107 See GUIDANCE FOR THE PART 503 RULE, supra note 56, at 20–23.
The primary data source regarding sewage sludge pollutants for EPA's preliminary assessment of health risks was a forty city study conducted by EPA in 1979 and 1980. The data in the study recognized forty pollutants found in municipal sewage sludges. EPA then relied on calculations predicting the amounts of these pollutants that would be found in soils treated with sewage sludge. These predictions were compared to standards for drinking water in order to determine if a listed pollutant could adversely affect human health. EPA acknowledged that this 1979–1980 study was outdated, and that the characteristics of sewage sludge had changed since then. In an effort to obtain more up-to-date data, EPA sent out questionnaires to a random sample of 479 POTWs. In November 1990, EPA published the National Sewage Sludge Survey: Availability of Information and Data, and Anticipated Impacts on Proposed Regulations, which outlined revisions to the originally proposed regulations. This notice included a relaxation of some of the limitations, including the allowable loading rates for land application. The new rates reflected permissible lifetime loads that were ten to twenty times higher than those included in the original proposal.

The new proposal also set forth the concept of "Clean Sludge," a set of alternative pollutant limits at or below which no restrictions would be set on the use of sewage sludge applied to land. However, if just one of the pollutant limits was exceeded, the Part 503 management practices and monitoring requirements would have to be met. This clean sewage sludge exemption allowed a sewage sludge-derived product meeting particular criteria to be marketed without regulation, as if it were an ordinary fertilizer.

---

109 See id.
113 Note, however, that under the final 503 rules, there are limits for "clean sludge." The risk assessment is based on the assumption that ten metric tons of sludge complying with "Exceptional Quality" (EQ) limits can be annually applied for one hundred years without causing harm. After using EQ sludge for 100 years, the pollutant loading rate would be the same as the cumulative pollutant loading rate which would pertain if the EQ limit were exceeded.
E. The Final Part 503 Rule

In 1993, EPA finally issued the Standards for the Use and Disposal of Sewage Sludge, otherwise known as the Part 503 Rule. The Part 503 Rule covers sewage sludge that is applied to agricultural and nonagricultural land, sold or given away in bags or containers (in many cases to home gardeners), placed in surface disposal sites (such as sewage sludge monofills, impoundments, storage piles, dedicated disposal sites, and dedicated beneficial use sites), or incinerated. In contrast to the 1989 proposed rule, there is no distinction between agricultural and nonagricultural land in the rule’s numerical pollutant limits for land application. In most cases, the rule requires compliance even if no permit is issued. Regarding land application, the rule contains pollutant limits, pathogen reduction requirements, vector attraction reduction requirements, management practices, and record-keeping and monitoring requirements. Although EPA did not use the term Exceptional Quality (EQ) sewage sludge in the regulations, the term was introduced in EPA guidance documents. An EQ sewage sludge must comply with certain pollutant concentration limits (see Table 3 in the Appendix), with Class A pathogen reduction requirements, and with eight options to reduce vector attraction.

1. Pollutants

The 503 Rule sets numerical limits for ten trace elements in sewage sludge applied to land. In the risk assessment, allowable numerical limits in sewage sludge were calculated based on the application rate.

---

115 See id. at 9256.
116 See id. at 9323.
117 See Plain English Guide, supra note 6, at 31–34.
118 The options to reduce vector attraction include: Option 1: Thirty-eight percent reduction in volatile solids content (organic matter which attracts vectors) during sewage sludge treatment; Option 2: Demonstration by additional anaerobic digestion in the laboratory; Option 3: Demonstration by additional aerobic digestion in the laboratory; Option 4: Specific oxygen uptake rate 1.5 mg/oxygen/hr/g total sewage sludge solids at 20°C for aerobically digested sewage sludge; Option 5: Use of aerobic processes 40°C for at least 14 days (e.g. composting); Option 6: Alkali additions to raise the pH to at least 12 at 25°C (77°F) and maintain pH 12 for 2 hours and maintain pH 11.5 for an additional 22 hours; Option 7: Reduce moisture content of stabilized sewage sludge to 75% solids or for unstabilized sewage sludge to 90%; Option 8: Reduce moisture content of unstabilized sewage sludge to at least 90% solids; Option 9: Inject beneath soil surface (non-EQ standard); Option 10: Incorporate sewage sludge within 6 hours of application (non-EQ standard). See id. at 121–25.
of ten dry metric tons per year for one hundred years. Additionally, EPA determined the ninety-ninth percentile sewage sludge concentration from the Agency’s National Sewage Sludge Survey. EPA chose the lower of those two values as the concentration limit for each pollutant and the higher value became the ceiling concentration limit (see Table 3 of the Appendix). If the trace element concentration is below the pollutant concentration limit, no additional pollutant control requirements must be fulfilled. If the trace element concentration in the sewage sludge is above the pollutant concentration, but below the ceiling concentration, the cumulative loading to the soil is limited by the cumulative loading limit. The cumulative loading limit is the same cumulative loading as if sewage sludge complying with the pollutant concentration limit were applied for one hundred years at ten metric dry tons per year. This cumulative loading limit applies to both agricultural and nonagricultural land.

Since EPA assumed that cumulative loading rate tracking would not be feasible for home gardens, the Agency established an annual pollutant loading rate for sewage sludge exceeding the pollutant concentration but complying with the ceiling concentration. The annual pollutant loading rate is based on a twenty-year application period instead of a 100-year application period.

The final rule does not regulate organic contaminants such as dioxins, furans, and PCBs. However, a regulation establishing numerical limits for dioxins, furans, and coplanar PCBs in land-applied sewage sludge is expected to be promulgated by December 15, 2001.

2. Pathogens and Vectors

The rule differentiates between Class A and Class B sewage sludges with regard to pathogen reduction. In Class A sewage sludge, pathogens have to be reduced to levels below those detectable by specific analytical methods. With regard to pathogens, no site or crop restrictions exist for Class A sewage sludge. For Class B sewage sludge, site and crop restrictions similar to, but more detailed than

120 See GUIDANCE FOR PART 503 RULE, supra note 56, at 98–101.
121 See id. at 99–101.
122 See id.
123 See id.
those contained in the 1989 proposal, are applicable (e.g., based on grazing animals, growing crops, and human contact). The final proposal does not include a Class C category as proposed in 1989. Class A pathogen reduction requirements are an EQ standard.126

In addition, the rule contains vector attraction reduction requirements. While vector attraction reduction options 1 through 8 reduce the vector attractiveness of the sewage sludge through stabilization, options 9 and 10 prevent vectors from coming in contact with the sewage sludge by soil incorporation or injection.127 Options 1 through 8 are part of the EQ standard.

3. Management Practices

If the sewage sludge is of EQ quality, it is exempt from further regulatory controls and may be used freely as a fertilizer or soil amendment.128 Otherwise, a number of general requirements and management practices apply to land application.129 The application rate to land should be less than the agronomic rate for nitrogen, and sewage sludge should not be applied to the land if it is likely to adversely affect a threatened or endangered species.130 Firms that make sludge commercially available are required to label or provide instructions for homeowners or landscapers who purchase non-EQ sewage sludge-derived products, and also to provide a statement that application is prohibited except in accordance with the instructions on the label.131

4. Monitoring and Record-Keeping

For EQ sewage sludge, the POTW monitors the pollutant concentration and certifies that the pathogen and vector attraction reduction requirements have been met.132 Additional certification and monitoring is required for non-EQ sewage sludge in order to track pollutants and ensure compliance with site, crop, management, and other general restrictions. In contrast to the 1989 proposed 503 rule, record-

128 See id. at 9390.
129 See id. at 9391–92.
130 See id.
131 See id.
keeping by a POTW for EQ sewage sludge is limited to the pollutant concentration, pathogen reduction, and vector attraction requirements.

5. Response to the New Part 503 Rule

Part 503 has been quite controversial.\textsuperscript{133} Perhaps the most serious criticism leveled at Part 503 is that, unlike European and Canadian sewage sludge standards, it does not rely on nondegradation models.\textsuperscript{134} A nondegradation approach does not permit an increase in trace element levels in the soil above background concentration levels as a result of land applications of sewage sludge. Another criticism stems from Part 503's reliance on fourteen different pathways of exposure (e.g., children ingesting sludge infused soil) to set up risk assessment models and then to calculate acceptable pollution limits.\textsuperscript{135} However, different risk assessment models result in different pollution limits. For example, the Dutch intervention values for contaminated soils are derived from a risk assessment. These intervention values have lower allowable soil concentrations for all metals, except for lead and mercury, than those EPA suggests pose no significant threat from land application of sewage sludge.\textsuperscript{136} It has been argued that the Dutch risk assessment places more emphasis on ecotoxicological effects than does EPA's risk assessment.\textsuperscript{137} Some commentators question whether this pathway of exposure is sufficiently accounted for in the EPA risk assessment. In addition, even within the United States, different soil standards are in effect. In New Jersey, for example, the proposed residential soil clean-up standards for cadmium are an order of magnitude lower than the allowable soil limits for cadmium accumulations from land applications of sewage sludge.\textsuperscript{138}


\textsuperscript{134} See generally S.P. McGrath et al., Land Application of Sewage Sludge: Scientific Perspectives of Heavy Metal Loading Limits in Europe and the United States, 2 Env. Review 114 (1994).


\textsuperscript{136} See McGrath et al., supra note 134, at 113.

\textsuperscript{137} See id.

Moreover, there are many in the scientific community who believe that by utilizing plant pollutant uptake coefficients that are too low, EPA seriously underestimated the human ingestion of pollutants from plants grown in sewage sludge-amended soils.\textsuperscript{139} Other critics believe that the plant growth pathway should have been based on more conservative yield reduction thresholds and more sensitive crops.\textsuperscript{140}

At the same time, EPA was being sued for being too conservative in its pollutant limits for chromium, molybdenum, and selenium. For example, in \textit{Leather Industries of America v. EPA}, suit was brought against the agency in order to challenge standards promulgated for chromium.\textsuperscript{141} The court held that EPA had abused its discretion by establishing high phytoxicity limits on soil concentrations of chromium where studies indicated no risk of phytoxicity at concentrations below the limits and EPA had no reliable data on the effects of higher concentrations.\textsuperscript{142} This case illustrates the scientific uncertainty surrounding the Part 503 regulations.

Based on the controversy surrounding EPA's regulation of sewage sludge, local communities have perceived greater risks from the current sewage sludge management system.\textsuperscript{143} Section 405(e) of the CWA states that the "determination of the manner of disposal or use of sludge is a local determination . . . ."\textsuperscript{144} Part 503 also allows generators to choose disposal options.\textsuperscript{145} Thus, many communities concerned about the possible adverse effects of sewage sludge application on


\textsuperscript{141} 40 F.3d 392, 405 (D.C. Cir. 1994). The Leather Industries of America filed a petition with the U.S. court of appeals to review the pollutant limits for chromium. EPA concluded that there are no data justifying the chromium regulation and subsequently removed all limits from the regulations. \textit{See id.} at 408.

\textsuperscript{142} \textit{See id.} at 407.

\textsuperscript{143} \textit{See Telephone Interview with Cindy Drill, Technical Operations and Product Development Manager, N-Viro Corp.} (Nov. 14, 1997) (notes on file with author) [hereinafter Drill Interview].

\textsuperscript{144} 33 U.S.C. \textsection 1345(e).

public health and safety have attempted to reject waste generated elsewhere by enacting ordinances that ban the spreading of sewage sludge.146

F. The Current Sewage Sludge Management System

Due to claimed administrative constraints, it is now common practice for some states to practice the "honor system" with regard to land application of sewage sludge.147 In most cases, the state will not keep track of how much waste is applied or where. If the sewage sludge is an EQ sewage sludge like most sewage sludge composts, pelletized sewage sludges, and advanced alkaline materials, these products can be marketed like any other fertilizer or soil amendment.148 However, even for non-EQ sewage sludges, most states will not keep track of how much waste is applied or where. The POTWs typically do not sign contracts with the landowners who accept the non-EQ sewage sludge, but rather they hire a land applier to remove the sewage sludge and locate farmers willing to take it. The land applier keeps records regarding where the sewage sludge is applied and when, but is not required by Part 503 to report this information to the POTW.149

The land applier usually signs a contract with the landowner; thus there is no direct link between the landowner and the POTW. The POTW is required to obtain a 503 Permit, while the sewage sludge applier is not. If a POTW provides sewage sludge to a person who does not change the sewage sludge quality, the POTW retains the responsibility for the ultimate use and disposal of the sewage sludge and must ensure that Part 503 requirements are met.160 Thus, permit compliance is left entirely in the hands of contract sewage sludge

---

146 See infra notes 152–63 and accompanying text for a discussion of communities' efforts to ban sewage sludge land application.
148 See supra note 128 and accompanying text.
150 Furthermore, POTW operator liability may result in criminal penalties, especially since the Ninth Circuit decision in United States v. Weitzenhoff, 35 F.3d 1275, 1286 (9th Cir. 1993) (holding plant operators criminally liable for discharges and defining "knowing" violations under the CWA as taking place when defendant knows he is discharging the pollutant in question, not when he knows that he is violating the terms of the statute or permit). If a POTW performs obligations under Part 503, however, criminal liability is unlikely.
hauliers with little regulatory stake in the management of the sewage sludge they apply. Land appliers are neither permittees nor landowners. This anomalous situation presents problems for POTWs whose non-EQ quality sewage sludge is applied directly to farmland. Consequently, municipalities either sell sludge to companies that convert it to EQ quality, or else install their own processing facilities.

III. SITING ISSUES REGARDING THE LAND APPLICATION OF SEWAGE SLUDGE

New York City recently faced local challenges to contracts it maintained with Merco Joint Venture to land-apply Class B sewage sludge to Texas grasslands. Caroline County and Culpeper County, both in Virginia, have adopted ordinances banning the land application of sewage sludge. Many other localities are actively fighting the land application of sewage sludge in their communities.

With most environmental laws, implementation of extensive regulatory frameworks have awakened public interest in the nature and extent of environmental problems. This increased awareness has in turn sparked local interest in programs that affect the quality of the local environment. Increased participation by local government in the environmental arena can enhance environmental protection by

151 However, in the recent case of United States v. Cooper, the Ninth Circuit held that nonpermittees/sludge haulers can be held liable for permit violations under certain circumstances. No. 97-50296, 1999 WL 194191 (9th Cir. Apr. 9, 1999). In that case defendant sludge hauler contracted with the City of San Diego to transport excess sewage sludge to Mexico. See id. The City had received a NPDES permit, which included the location where the excess sewage sludge was to be shipped. See id. After Mexican authorities detained trucks carrying defendant's sewage sludge, he decided to land apply the sewage sludge at a local farm instead, without notifying the City or receiving a new permit for such application. See id. The court held defendant criminally liable for permit violations even though he was not the permittee because there was ample evidence that the defendant knew of the City's NPDES permit and its application to his conduct. See id.

152 Middlesex County Utilities Authority in New Jersey has constructed, in conjunction with N-Viro Soil, the largest processing facility in the country and markets products to area farmers and topsoil manufacturers. See N-VIRO INT'L CORP., PROCESS & FACILITY TECHNICAL INFORMATION BOOKLET (1998) (on file with authors).


155 See infra notes 158–59 and accompanying text.

156 This momentum can most clearly be seen in the Right-to-Know movement. Many local communities have right-to-know ordinances, which require varying degrees of disclosure from handlers of hazardous waste. See Hazard Communication Report, 14 Env't. Rep. (BNA) 1899, 1899 (Mar. 2, 1984).
tailoring federal and state programs to fit local needs and concerns. But on the other hand, local governments are particularly sensitive to public outrage, and may thus exacerbate the "not in my backyard" (NIMBY) syndrome. In addition to the siting issues discussed below, land application of sewage sludge in areas inhabited predominantly by minority and low-income populations may be complicated by "Environmental Injustice" claims.

The sewage sludge management issue illustrates both the positive and negative aspects of local environmental regulation. For example, California has 500,000 acres of prime agricultural land situated along the San Joaquin Delta. The Regional Resource Control Board for this area decided to follow Part 503 and issue land application permits. But just when local farmers began to rely on these land application permits, the Delta Protection Commission, along with San Joaquin Valley County, adopted local ordinances banning the land application of sewage sludge on agricultural land.

As the nation strives for long-term effective management of sewage sludge, local controls such as the ban imposed by the Delta Protection Commission are becoming more prevalent. The popularity of local bans on sewage sludge land application is due primarily to the common perception that state control over the Part 503 process is insufficient to protect local health and safety. And to some extent, these fears are not unfounded. EPA has de-invested in Part 503, while diverting fiscal resources to other programs under the CWA. EPA has allowed regional offices to issue site-specific permits at their own

159 See Telephone Interview with Ron Liebert, Associate Counsel, California Farm Bureau (Nov. 14, 1997) (notes on file with authors) [hereinafter Liebert Interview].
160 Stanislaus County is also currently planning prohibition. A recent case also mandated that the State Water Resource Control Board must prepare a statewide E.I.R. examining the land application program in two to three years. See Liebert Interview, supra note 159.
161 Attempted bans may also take the form of indirect restrictions or requirements such as zoning restrictions, buffer requirements, or soil, groundwater, and surface analysis requirements that make the cost of land application noncompetitive.
162 See Liebert Interview, supra note 159.
pace, while proclaiming that Part 503 is self-implementing. The states have also followed the self-implementation approach. States such as Pennsylvania and New Jersey no longer keep track of how much sludge is applied or where. Responsibilities have shifted to plant operators.

As the Part 503 structure becomes less centralized, local attempts at control will become even more prominent. Thus, it is necessary to examine the validity of local challenges to land application. Local ordinances restricting and banning the spreading of sewage sludge may be challenged in the legal forum in two ways. First, local bans may be challenged on the ground that they are preempted by state and federal law. And second, local controls may be challenged on the ground that they are a threat to the national political and economic unity established under the dormant Commerce Clause of the United States Constitution. In a recently decided case, Welch v. Board of Supervisors of Rappannock County, the federal district court for the Western District of Virginia upheld a county ordinance banning the land application of sewage sludge against both types of challenges. After Welch, the commercial sewage sludge industry was reluctant to bring any more challenges against local ordinances on preemption and dormant Commerce Clause grounds. However, the ruling in Welch is not as dispositive as it seems, and may be open to attack. So the question remains as to whether local ordinances banning the land application of sewage sludge will be upheld in the face of challenges by the industry.

A. Preemption Challenges

Some states preempt local governmental units from utilizing land use controls to regulate the land application of sewage sludge, while

---

164 See id. at 25.
165 See Stranahan, supra note 147, at A1.
166 The states estimate that they will save $83 million in paperwork and monitoring. See id. at A14.
167 See Plater et al., supra note 157, at 328.
168 See id. at 344.
169 888 F. Supp. 753, 759 (W.D. Va. 1995); see also United States v. Cooper, No. 97-50296, 1999 WL 194191 (9th Cir. Apr. 9, 1999) (affirming the decision in Welch, holding that regulations do not usurp local control over the disposal of sewage sludge).
170 Instead, industry increased pressure on state legislatures to enact preemptive legislation. See Drill Interview, supra note 143.
others either explicitly recognize the authority of local governments or are ambiguous in defining the role of local entities.\footnote{An example of state preemption may be seen in Ohio. A proposal to ship 50,000 dry tons of New Jersey sewage sludge to Ohio every year for application to farmland has drawn fire from local citizens, who formed Citizens Concerned about Sludge in the State of Ohio. The Ohio Environmental Protection Agency approved a request by Wheelabrator, Inc. to truck Passaic Valley, N.J., sewage sludge to Ohio. Because Ohio state law specifically preempts local governments from utilizing land use control to regulate this type of situation, local governmental units can do nothing to address citizen concerns. See \textit{Ohio Rev. Code Ann.} § 519.21 (West 1998).}

1. Existing Preemption Jurisprudence

There are three ways in which local ordinances banning land application may be preempted: express preemption, implied preemption, and actual conflict.\footnote{See \textit{Plater et al.}, supra note 157, at 328.} Express preemption is explicit in state or federal statutory language. Implied preemption is used when no express statements are made in the statutory language. In deciding whether there is implied preemption, courts look to whether the federal or state law occupies the field of sewage sludge management.\footnote{See generally \textit{Perry v. Providence}, 578 N.E.2d 886 (Ohio Ct. App. 1991); Talbot County v. Skipper, 620 A.2d 880 (Md. App. 1993); Michigan Disposal, Inc. v. Augusta, 280 N.W.2d 596 (Mich. App. 1979).} For example, in \textit{Holgate Property Associates v. Township of Howell}, the court decided that New Jersey's Solid Waste Management Act (SWMA), in its application to specially derived sewage sludge products, preempted local zoning and police power ordinances and thus barred the exercise of municipal authority over activities involving sewage sludge derived products.\footnote{679 A.2d 613, 616 (N.J. 1996); \textit{see also} Franklin County v. Fieldale Farms Corp., 507 S.E.2d 460, 463–64 (Ga. 1998) (holding that Georgia's state statute regulating the application of sewage sludge on land implicitly preempted a county land application ordinance establishing a duplicate permit system that was not authorized by the general law).} Howell Township served Holgate with a stop work order to prevent the company from transporting composted sludge to a sand quarry for distribution to landscapers.\footnote{See \textit{Holgate}, 679 A.2d at 614.} Holgate filed suit, claiming that the SWMA preempted Howell from enforcing its ordinance because the SWMA presents a comprehensive statutory and regulatory scheme that completely occupies the field of solid waste management, even though general statutory language exists authorizing local regulation of threats to health and safety.\footnote{See \textit{id.} at 615.} The court analyzed the statutory language and agreed, concluding...
that the legislature recognized management of solid waste to be a statewide system entailing a degree of expertise that transcends the capacities and interests of local government.\textsuperscript{177} Provided that land application of sewage sludge conforms to state permitting requirements, courts have consistently held that land application is a normal agricultural practice, and thus it is often protected from local regulation.\textsuperscript{178}

In \textit{Talbot County v. Skipper}, the Maryland Court of Appeals held that the Maryland Code implicitly preempted a Talbot County ordinance requiring landowners to record certain information in the county land records before applying sewage sludge to their land in accordance with state permits.\textsuperscript{179} Bio-Gro Corporation, a commercial sewage sludge provider, and the farmers with which it contracted, filed suit against the county. The plaintiffs alleged that the state, by enacting comprehensive legislation, preempted the field of sewage sludge land application.\textsuperscript{180} The court held that state law governing sewage sludge application impliedly preempts local law when the local law deals with an area in which the state legislature has acted with such force that intent by the State to occupy the field must be implied.\textsuperscript{181} The court reasoned that because the statute specifically recognized and provided for local control under certain circumstances, those areas not mentioned were intended to be preempted.\textsuperscript{182} Lastly,

\begin{itemize}
\item \textsuperscript{177} However, the court also recognized that because of the significant impact that state-level decisions would have on local affairs, there is an implied duty on the state to consider local concerns and allow for local participation, even though the statute does not require it. \textit{See id.} at 616. \textit{But see Holmes v. Board of Zoning Appeals of Jasper County, 634 N.E.2d 522, 525 (Ind. App. 1994)} (holding that the board of zoning appeals refusal of a special exemption for the spreading of residential septage was not preempted by the state's Environmental Management Act because there was nothing in the act that contained a hint of preemption and the board's actions were not inconsistent with the act).
\item \textsuperscript{178} \textit{See County of Grundy v. Soil Enrichment Materials Corp., 292 N.E.2d 755, 759 (Ill. App. Ct. 1973)}. Although Right to Farm Statutes are typically enacted to protect farm operations from nuisance liability they also may be used to prohibit local ordinances from regulating farm activities and agricultural uses of the land. The rationale behind their preemptive power is that as rural areas become more developed, the political power of farmers declines and members of the nonfarming community may exercise influence to control agricultural activities. Thus, these laws attempt to protect farming operations from developmental pressures by broadly defining the agricultural activities that warrant protection. \textit{See Margaret Rosso Grossman & Thomas S. Fischer, Protecting the Right to Farm: Statutory Limits on Nuisance Actions Against the Farmer, 1983 Wisc. L. Rev. 95, 125 (1983)}.
\item \textsuperscript{179} 620 A.2d 880, 880 (Md. App. 1993).
\item \textsuperscript{180} \textit{See id.} at 883.
\item \textsuperscript{181} \textit{See id.} at 885.
\item \textsuperscript{182} \textit{See id.}
the court found the Maryland law preempted the ordinance because the recording requirement was not a typical type of local regulation. Thus, local controls may be preempted if a court, in its interpretation of a statute, concludes that there is no legislative intent to leave room for local regulation, and the local regulation is not one traditionally left to local control.

If local ordinances deal with issues traditionally left to local control, however, the fact that a state may have enacted extensive legislation in the field of sewage sludge management does not automatically imply preemption. In County Commissioners of Queen Anne's County v. Soaring Vistas Properties, Inc., the Maryland Court of Special Appeals held that Maryland's state law did not implicitly preempt a local zoning ordinance that controlled the location of a sewage sludge storage facility, because the legislature clearly contemplated local involvement in traditional zoning matters and issues of local concern. The court went on to state that, although Maryland's sewage sludge regulations include requirements pertaining to the location of sewage sludge storage facilities, they do not provide an exhaustive list of criteria for local authorities to follow. Thus, because the location of the storage facility is of keen local interest, the court decided that this matter should be considered at the local level. According to the court, the state regulations were to be interpreted as complementing, not replacing, local zoning law.

Even when there is no implied preemption, a state statute may preempt local control if there is actual conflict between a local ordinance and state law. In Perry v. Providence Township, a town zoning resolution completely banning land application of sewage sludge was held invalid because it was in direct conflict with state law permitting such land application. The court outlined a general test: when the local ordinance permits or licenses that which the state forbids and prohibits, and vice versa, the ordinance is in conflict with the state law, and is therefore preempted.

---

183 See id. at 886.
186 See id. at 1077.
187 578 N.E.2d 886, 890 (Ohio Ct. App. 1991). It is important to note that Ohio is not a home rule state, and it affords limited authority to local government. Thus, in examining preemption, one must first look at state enabling acts.
188 See id. at 888; see also Michigan Disposal, 280 N.W.2d at 599. The court held that an
It is important to note that although local ordinances may be preempted by state regulation, they may not be preempted by the CWA. Until recently, the preemption cases dealing with local bans of sewage sludge land application addressed only state preemption issues. The Welch case, discussed earlier, was the first case to address the issue of federal preemption. The court held that a Virginia County ordinance banning the land application of sewage sludge was not preempted by the CWA. Welch asserted that the local zoning amendment conflicted with a national policy regarding the use and disposal of sewage sludge. According to the plaintiff, this policy manifested itself in a comprehensive program authorized by statute and effectuated by agency regulation. This program gave local government some role, but the role was not extensive enough to allow the banning of any one practice of disposal or use. The court rejected this argument and held that the ordinance did not stand as an obstacle to achieving the purpose of the federal law, but rather that Congress has exercised its power to permit states and localities to regulate the manner of sewage sludge disposal or use. The court stated that regardless of EPA's general preference for land application, Part 503 left the ultimate determination of sewage sludge disposal and use to the states and localities, and thus it was clear that no preemption was intended. The court, in determining that there was no conflict between local regulation and federal policy, seemed to leave a place for local regulation in the overall structure of Part 503, recognizing that "where the . . . local regulation addresses public health concerns, there is a presumption against preemption."

ordinance regulating the land application of sewage sludge, which provided that a license shall be granted only if the zoning board determined that the proposed activity would not pollute, impair, or destroy significant natural resources, create hazards to public health and safety, or result in public or private nuisance, was invalid to the extent the ordinance allowed the township to deny a permit for sewage sludge application based on factors previously determined by state authorities. See id. The ordinance conflicted with state controls, and was therefore preempted. See id. at 330.

See Welch, 860 F. Supp. at 331.

See id. at 331.

See Welch, 860 F. Supp. at 331.
B. Dormant Commerce Clause Challenges

The Commerce Clause of the United States Constitution states that "Congress shall have power ... to regulate Commerce ... among the several States." Because Congress holds the power to regulate, states or their sub-units are forbidden from passing laws that unduly burden interstate commerce. The dormant (negative) aspect of the clause empowers the courts to strike down legislation conflicting with the nationalization policies of the Commerce Clause, thereby restricting the states even when Congress has not directly exercised its power to preempt states.

1. Existing Commerce Clause Jurisprudence

In evaluating whether a local ordinance is inconsistent with the dormant Commerce Clause power vested in the federal government, the analysis is similar to regulatory takings jurisprudence. A proper grant of authority to the local government must be demonstrated, the ordinance must serve a proper public purpose, there must be a sufficiently close means-ends relationship, and the ordinance must not cause an excessive burden on interstate commerce.

The United States Supreme Court has developed a two-pronged approach in dealing with cases implicating the dormant Commerce Clause. The initial inquiry is whether the state or local law is facially discriminatory or facially evenhanded. Discrimination, in this context, simply means differential treatment of in-state and out-of-state economic interests that benefit the former and burden the latter. If the Court finds that the law is facially discriminatory, then the Court applies a virtual per se rule of invalidity. Under this rule, the law or local ordinance must pass the strictest level of scrutiny, meaning that the state or locality must show that it advances a legitimate local purpose that cannot be adequately served by reasonable nondiscriminatory alternatives.

---

195 U.S. Const., art. I, § 8, cl. 1, 3.
198 See id.
199 See id.
201 See id.
The second prong of the Court's analysis of dormant Commerce Clause issues prescribes the balancing test established in *Pike v. Bruce Church, Inc.* The test applies where a law regulates even-handedly, with only incidental effects on interstate commerce. A law that regulates even-handedly does not discriminate on its face and is valid under the dormant Commerce Clause "unless the burden imposed on such commerce is clearly excessive in relation to the putative local benefits." In other words, if a legitimate local purpose is found, then the question becomes one of degree: the burden on interstate commerce is weighed against local benefits in a complex calculus that seeks to account for local benefit and the extent of burden on the interstate flow of goods.

It is well settled that the disposal of solid waste is an article of commerce—the article of commerce is not the solid waste itself, but rather the processing and disposing of it. The Court has consistently used the dormant Commerce Clause to strike down attempts by states and localities to regulate the flow of out-of-state solid and liquid waste across their borders. The benchmark case in this area is *City of Philadelphia v. New Jersey*, in which the Court held that New Jersey could not ban the import of waste generated outside state borders. The Court found New Jersey's statute to be facially discriminatory, and an attempt by one state to isolate itself from a problem common to many with the erection of a barrier against the movement of interstate trade. The Court categorized solid and liquid waste as commodities in commerce, not as a regulated stream to which the Commerce Clause would not be applicable. All objects of interstate trade merit Commerce Clause protection—none is excluded by definition at the outset. The Court then found that legitimate local concerns of health and safety were not warranted because

---

203 *397 U.S. 137, 142 (1970).*
204 *See id.; Oregon Waste Sys., 511 U.S. at 98.*
205 *Pike, 397 U.S. at 142.*
206 *See id.*
208 *See id.; see also Chemical Waste Management v. Hunt, Inc., 504 U.S. 334, 334 (1992).*
209 *437 U.S. 617, 629 (1978).*
210 *See id. at 628.*
211 *See Stanley E. Cox, Burying Misconceptions About Trash and Commerce: Why it is Time to Dump Philadelphia v. New Jersey, 20 CAP. U. L. REV. 813, 829 (1991) (arguing that Philadelphia v. New Jersey was wrongly decided because trash is not a commodity but a regulated stream).*
212 *See Philadelphia, 437 U.S. at 622.*
New Jersey banned only out-of-state wastes that were no different from the in-state wastes that could be legally dumped.\footnote{See id. at 629. The Court refused to liken the solid waste law to quarantine laws banning the importation of articles because of their innate harmfulness, because New Jersey was not regulating the transportation of waste, only its ultimate disposal. See id. at 628–29.}

Not all laws that discriminate against out-of-state commerce are forbidden as protectionist measures.\footnote{See H.P. Hood & Sons, Inc. v. Du Mond, 336 U.S. 525, 533 (1949) ("The distinction between the power of the state to shelter its people from menaces to their health or safety ... is one deeply rooted in both our history and our law .... This court consistently has [supported local rights] to impose even burdensome regulations in the interest of local health and safety.").} The Court has given significant deference to environmental measures in the determination of whether there is a legitimate local interest.\footnote{See Maine v. Taylor, 477 U.S. 131, 151 (1986); see also Procter & Gamble v. Chicago, 509 F.2d 69, 79 (7th Cir. 1975).} It has validated state and local quarantine laws that prevent traffic in noxious articles, whatever their origin, because “their worth in interstate commerce [is] far outweighed by the dangers inhering in their very movement.”\footnote{See id. at 148 & n.19, 149.}

In \textit{Maine v. Taylor}, the Court upheld a total ban on the importation of baitfish to prevent the introduction of disease.\footnote{See id. at 148. The Court found that Maine had a legitimate interest in guarding against imperfectly understood environmental risks, despite the possibility that they may ultimately prove to be negligible. See id.} The Court concluded that the state retains broad regulatory authority to protect the health and safety of its citizens and the integrity of its natural resources, even though interstate commerce may be affected.\footnote{See id. at 148.} The Court held that the ban legitimately protected the State’s fisheries from parasites and nonnative species, even though the issue of whether there was any scientific justification of Maine’s total ban was contested by the parties.\footnote{See id. at 130–52.}

In the field of interstate movement of waste, however, parties have not successfully asserted this quarantine doctrine.\footnote{See PLATER ET AL., supra note 157, at 350–51.} In \textit{Philadelphia}, the Court refused to accept the New Jersey legislature’s alleged purposes of protecting health and safety because they were sought by illegitimate means.\footnote{See \textit{Philadelphia}, 437 U.S. at 622.} Even if the statute was structured so that it regulated waste evenhandedly,\footnote{See 437 U.S. at 626–27.} the Court might still reject a quarantine analysis: “a State [or sub-unit] is without power to prevent
privately owned articles of trade from being shipped and sold in interstate commerce on the ground that they are required to satisfy local demands” of health and safety. The Court, in holding that New Jersey could not close its open landfills to out-of-state disposers even if the state’s ultimate purpose in doing so was to protect health and safety, refused to accept solid waste disposal as endangering health and safety.

In Government Suppliers Consolidated Services, Inc. v. Bayh, the federal district court for the southern district of Indiana refused to apply the quarantine exception to an Indiana tipping fee which essentially barred all out-of-state solid waste from being shipped into the state. The court relied on the decisions in City of Philadelphia, Illinois v. General Electric Company, and National Solid Wastes Management Ass’n v. Alabama Department of Environmental Management to conclude that the interstate movement of infectious waste could not be distinguished from the interstate movement of nuclear, hazardous, or solid waste, and therefore the cases in which the quarantine exception was used to uphold local restrictions did not apply.

The U.S. Supreme Court validated this decision in Chemical Waste Management, Inc. v. Hunt. The Alabama Supreme Court upheld the state’s differential tipping fees based on the quarantine rationale proposed in Maine, but the U.S. Supreme Court reversed. The Court held that the law could not be deemed a legitimate quarantine law because it permitted landfilling of waste by in-state disposers, and it isolated the state from the nationwide problem of waste disposal.

223 Id. at 627 (quoting Foster-Fountain Packing Co. v. Haydel, 278 U.S. 1, 10 (1928)).
224 See id. at 629. Admittedly, this reasoning is circular: if New Jersey banned all waste, the court might conclude that there were legitimate concerns of health and safety. But no claim was made that the movement of waste into and through New Jersey endangers health.
226 See id. at 764 (citing Philadelphia, 437 U.S. at 622); Illinois v. General Elec., Co., 683 F.2d 206, 214 (7th Cir. 1982) (holding that the importation of nuclear waste is commerce that does not fall within the quarantine cases); National Solid Wastes Management Assoc. v. Alabama Dep’t of Envtl. Management, 910 F.2d 713, 720–21 (11th Cir. 1990) (holding that hazardous waste is commerce that does not fall within the quarantine cases).
228 See id. at 348.
229 See id. at 343 & n.5. The Court noted that the hostility must be to the thing itself, not to merely interstate shipments of the thing; and an undiscriminating hostility is at least nondiscriminatory. See id. at 347 n.11 (quoting Illinois, 683 F.2d at 214).
2. Welch Stands Alone in Allowing Interruption of Interstate Transport of Waste

Welch is the only sewage sludge management case in which a court has allowed the interruption of the interstate flow of solid waste on local health and safety grounds. One reason this decision stands alone is that the local ordinance upheld in Welch banned all land application of sewage sludge, not just sewage sludge generated out-of-state. Thus, local control was even-handed and the court applied the looser Pike balancing test, in which the regulation is given more deference. Under this test, if a legitimate local purpose is found, the burden on interstate commerce tolerated depends on the nature of the local interests involved and on whether they could be promoted with a lesser impact on interstate commerce. In Welch, the court noted that given the county's strong local interest in promoting health and safety, in order to succeed with a dormant Commerce Clause claim, the plaintiffs had to overcome a strong presumption of validity. The plaintiffs here had not overcome that presumption.

The court concluded that the county rationally believed that the land application of sewage sludge posed health and safety risks, thus a legitimate local interest was furthered by the ordinance. The court credited the county with articulating five risks the ordinance was designed to protect against, including: (1) possible harm to the environment; (2) possible harm to human and animal health; (3) loss of public confidence in agricultural products; (4) reduction in crop values; and (5) damage to tourism in the area. The court concluded that despite the scientific dispute about the safety of land application, there was at least a rational basis for believing that the ordinance would protect the health and safety of those within the county.


231 See id. at 755. An interesting case might be made for the market participant exception if the county allowed disposal of its own sludge. Under this exception the county could argue that they were protecting themselves as a market participant.

232 See id. at 758. The County originally urged the court to rely on Kassel v. Consolidated Freightway Corp., 450 U.S. 622 (1981), which held that if local safety concerns are not illusory, then the federal courts should not second-guess. However, the court in Welch recognized that a balancing is required even for health and safety ordinances. See id.

233 See Welch, 888 F. Supp. at 759.

234 Id. at 760.

235 See id.

236 See id.

237 See id.
Next, the court found that the farmers who brought suit failed to show that the ordinance impeded the free flow of interstate commerce.\textsuperscript{238} The court stated that because the ordinance did not ban sewage sludge disposal within the county, only land application as a method of disposal, the burden imposed on interstate commerce was de minimis at best.\textsuperscript{239} The farmers argued that the ordinance deprived them of the substantial economic benefits of applying sewage sludge on their land.\textsuperscript{240} The court held, however, that the denial of a commercial interest to one particular group negatively affected by the ordinance does not rise to the level of a Commerce Clause violation.\textsuperscript{241} Thus, the local ordinance was upheld because of the nature of the local interest and the slight burden on interstate commerce.\textsuperscript{242}

3. Welch's Consistency with Existing Commerce Clause Doctrine

The practical assumption is that the Supreme Court will not overrule the strong dormant Commerce Clause precedents established in the solid waste field. Thus, it is necessary to examine whether the Welch decision is consistent with existing Commerce Clause doctrine. CWA section 405(e) and EPA's Part 503 rule authorize local governments to enact controls on land application of sewage sludge.\textsuperscript{243} Furthermore, a sufficiently close means-ends rationality exists because local bans effectively accomplish the objectives of health and safety.\textsuperscript{244} Thus, the remaining inquiries are whether local bans, such as the county ordinance in Welch, avoid excessive burdens on interstate commerce and whether these local controls serve a proper purpose.\textsuperscript{245}

\textsuperscript{238} See id.
\textsuperscript{239} See id.
\textsuperscript{240} See Welch, 888 F. Supp. at 759.
\textsuperscript{241} See id. The court, however, left open the possibility of further suits. It is possible that some evidence will be adduced that shows a greater burden on the free flow of sewage sludge because of the ordinance. The important point is that plaintiffs had failed to present significant evidence of such a burden. See id. at 759–60.
\textsuperscript{242} See id. at 760.
\textsuperscript{243} See 33 U.S.C. § 1345(e) (1994); 58 Fed. Reg. 9248, 9251 (1993). The authority of municipalities to regulate land application of sewage sludge under the CWA is subject to State Enabling Acts or Right to Farm Acts, which may counteract such power.
\textsuperscript{244} See Procter & Gamble, Co. v. Chicago, 509 F.2d 69, 75–76 (7th Cir. 1974) ("[T]he means chosen to accomplish the end should be deemed reasonably effective unless the party attacking the legislation demonstrates the contrary by clear and convincing proof.").
\textsuperscript{245} See PLATER ET AL., supra note 157, at 350–51.
4. Ingredients of Possible Successful Commerce Clause Challenges to Land Application Bans

The court in *Welch* left open the possibility that a dormant Commerce Clause challenge might be successful against local bans. First, in assessing the burden on interstate commerce, the court focused on the burden the ordinance imposed on farmers, disregarding burdens that might be imposed on the rest of the commercial sewage sludge industry. In considering the economic perspective of the farmers, the court concluded that the county ordinance simply did not rise to the level of impediment necessary to hold it in violation of the Commerce Clause. More excessive burdens could be placed on the industry by states and communities, however, and those burdens might weigh more heavily in a judicial balancing.

a. Demonstrable Burden to Whole Sewage Sludge Industry

A suit brought by the sewage sludge product industry, including commercial producers, brokers, and haulers/applicators, combined with POTWs, might establish more of a burden on interstate commerce. These plaintiffs would represent a complete industrial sector to be shut out of local economies if sewage sludge application bans are upheld. Furthermore, if incineration or landfill facilities are not in close proximity, POTWs will be forced to ship sewage sludge elsewhere, substantially increasing transaction costs, which must then be passed on to customers of the POTW.

These burdens might be compounded by the nibbling effects that local bans can have on the free flow of commerce. Hypothetically speaking, all the counties in a state could impose such ordinances, thereby shutting the sewage sludge industry entirely out of the state. The Court might conclude that this constitutes a significant burden on national commerce, and thus is an attempt by local communities to isolate themselves from a national concern, as was the case in *City of Philadelphia*.

---

246 See *Welch*, 888 F. Supp. at 759.
247 See id.
248 See id. at 759–60.
249 The farmers' argument was weak: the denial of their profit would not obstruct the nationalization policies embodied in the commerce clause. See id. at 759.
250 In some instances, municipal treatment facilities also produce sludge-derived products.
251 See *Philadelphia*, 437 U.S. at 629.
Under Welch, would the importance of local health and safety concerns outweigh such a burden? According to the Supreme Court in City of Philadelphia, it could not. City of Philadelphia can be read as prohibiting states from closing open landfills, even if the states' ultimate purpose in doing so is to protect public health. Thus, it is possible that local ordinances banning land application of sewage sludge might be struck down as attempts to close private farmlands.

b. Fragile and Unsupported Claims of Danger to Health and Safety

The Welch court's finding of legitimate health and safety concerns might also be challenged. After hearing conflicting scientific evidence from both sides, the court relied on the county's five areas of concern to find a rational belief that the ordinance would protect health and safety. Thus, at least implicitly, the court relied on a quarantine-like rationale to find legitimate local purpose. The concerns articulated by the county and relied on by the court focused on sewage sludge as a noxious item. Yet no court has ever found solid/liquid waste to fall within a quarantine exception to dormant Commerce Clause attack. In order to justify its quarantine rationale, the Welch court classified sewage sludge as a regulated stream or pollutant. This classification seems contrary to the holdings in Philadelphia and Carbone. The mere fact that sewage sludge is regulated by EPA does not warrant the application of a quarantine rationale. The court in Welch failed to consider that sewage sludge-derived products are often exempt from EPA regulations (as "clean sludge") and, thus may be considered

---

252 See id. Given that the Supreme Court saw no danger in solid waste disposal, it is likely it would not tolerate such a burden on interstate commerce. See id.

253 See id. Farmlands are an equally scarce resource.

254 See Welch, 888 F. Supp. at 759. However, it also seems that there was enough evidence to rationally conclude that land application is safe.

255 See id.

256 If nuclear waste and hazardous waste do not qualify for this exception, solid waste certainly will. See National Solid Waste Management Assoc. v. Alabama Dep't of Env'tl. Management, 910 F.2d 713, 720-21 (11th Cir. 1990); Illinois, 683 F.2d at 214.

257 See Welch, 888 F. Supp. at 755 ("Notwithstanding [its] apparent benefits ... sewage sludge is a pollutant and is regulated.").

258 In both cases, the Court held solid waste and its processing and disposal to be commodities and not regulated streams. See generally C & A Carbone, 511 U.S. 383; Philadelphia, 437 U.S. at 617.

259 Solid waste is regulated also and is defined as a commodity, not as a substance to which a quarantine rationale applies. See C & A Carbone, 511 U.S. at 391; Philadelphia, 437 U.S. at 629.
as fertilizers. Furthermore, if the county was really concerned with health and safety, and actually wanted to ban sewage sludge as a noxious item, why did it allow sewage sludge to be transported, and landfilled within the county?

5. Commerce Clause Attack Still Unlikely to Prevail

Despite Welch's inconsistencies with existing doctrine, a dormant Commerce Clause attack on a sewage sludge application ban is still likely to be a tenuous argument. It is possible that the sewage sludge products industry could establish that bans place great burdens on interstate commerce; however, it is unlikely that these burdens will be deemed clearly excessive in relation to the putative local benefits. Even if the economic perspective examined by the court included the larger sewage sludge product industry, it is also possible that the court might broaden the sewage sludge industry to include incineration facilities and landfills. Thus, a court might conclude that the local ordinances simply deny a commercial benefit to one particular group negatively affected by it, but do not rise to the level of a Commerce Clause violation. It is also unlikely that bans on land application will warrant claims of economic protectionism, because the ordinances ban all sewage sludge land application, regardless of its origin.

Because Welch has not been overturned, it is also possible that other courts will find that local ordinances serve legitimate public purposes. Welch's quarantine-like rationale could guide other courts to classify sewage sludge as a pollutant rather than a commodity. Thus, local governments can more easily establish a legitimate local interest by arguing that sewage sludge is a noxious item that poses unique health and safety risks. Like nuisance regulations, protec-

---

260 See supra notes 112-13 and accompanying text.
261 No claim was made by the county that the very movement of sewage sludge through the county endangers health. This seems contrary to a quarantine rationale.
262 This is especially so since the CWA and EPA's Part 503 Rule give local governments the authority to choose sludge disposal options.
264 See Welch, 888 F. Supp. at 759.
265 See Philadelphia, 437 U.S. at 622 (holding that a state can limit importation of wastes to protect health and the environment, but that it cannot do so for simple economic protectionism). Philadelphia would not apply to complete bans on land application of sewage sludge, because such bans are nondiscriminatory. See id.
266 See Welch, 888 F. Supp. at 759.
tion of health and safety has traditionally been an area of local control, and courts will likely defer to local governments when they act to protect citizens.268

Furthermore, lack of scientific evidence proving the dangers of land application of sewage sludge does not bar local health and safety ordinances.269 If sewage sludge is regulated as a noxious item, the local government has a legitimate interest in guarding against imperfectly understood environmental risks, despite the possibility that they may ultimately prove to be negligible.270 Thus, it is enough that a ban can rationally be perceived as protecting health and safety.271 If a local government’s determination that its regulation serves a legitimate public purpose is at least debatable, it is likely that a challenge to that action will fail.272

Consequently, it is unclear whether Welch will set the tone for the decisions of other courts addressing the issue of land application of sewage sludge. Welch leaves open the possibility that a heavier burden on interstate commerce might be shown, and its quarantine-like rationale contradicts Commerce Clause doctrine in the field of solid waste. But at the same time, it seems unlikely that a court will find a burden so great as to overrule local concerns of health and safety.

Thus, local governments may use siting as one way of protecting their communities from exposure to the uncertain risks of sewage sludge land application. However, what happens when application sites are poorly sited in the first place? The next section of this article analyzes a second way of protecting public health, via various tort liabilities attached to sewage sludge land application. Such liability can provide those affected by land application projects with causes of action that might deter future conduct of applicators. But will these tort causes of action be successful?

268 It is well settled that the state’s regulatory powers are greatest when they address traditional matters of local concern, such as the environment and natural resources. See Kassel v. Consolidated Freightways Coop., 450 U.S. 662, 670 (1981).

269 See Maine, 477 U.S. at 148.

270 See id.

271 See Welch, 888 F. Supp. at 759.

272 See United States v. Carolene Products Co., 304 U.S. 144, 154 (1938) (upholding the Filled Milk Act, which forbade the shipment in interstate commerce of skimmed milk compounded with fat or oil other than milkfat, on public health and safety grounds).
IV. Toxic Tort Liability

A. Common Law Liability

Although POTWs, private actors, and farmers who choose to apply sewage sludge to land might be protected from local prohibitions against such activity by state and federal (statutory or constitutional) law, they still can be subject to private tort actions brought by local citizens. Tort law offers an aggrieved plaintiff the possibility of monetary recoveries and a variety of injunctive remedies.273

A trespass action can be brought against a polluter who physically invades a plaintiff's property. Damages are available for all consequential injuries throughout the chain of causation, and the statute of limitations is typically long. Toxic tort actions based on trespass seem to encourage the grant of injunctions by emphasizing the unpermitted invasion, penetration, or incursion of a pollutant onto private property.274 Trespass as a cause of action, however, is subject to a number of restrictions, most importantly that in most states it cannot be based on negligence liability.275

Negligence has seldom been the sole theory of recovery in successful environmental law cases. The apparent reason for the rare use of negligence causes of action is that in cases involving injury to property, trespass and nuisance (or strict liability) are easier to prove.276 Historically, in the sewage sludge management field, nuisance actions have been the most common cause of action used by private tort plaintiffs.277 Private nuisances occur where there is an invasion of reasonable interests in the use and enjoyment of land. Just as in the typical negligence lawsuit for damages based on injuries suffered in an accident, the plaintiff in a nuisance action must carry the burden of proving that he has suffered harm, that the defendant's conduct

273 See Plater et al., supra note 157, at 166.
274 See id. at 189.
275 Furthermore, it is extremely difficult for courts to determine whether a "physical invasion" has occurred. See id.
276 However, one of the advantages of negligence causes of action for plaintiffs, besides its familiarity to the bench, is that tort claims acts waiving sovereign immunity may only cover negligence. Also, under some insurance policies, defendants will only be covered for accidental discharges, not intentional pollution, so a negligence judgment is more likely to be paid. See id. at 192.
277 See generally Grossman & Fischer, supra note 178.
caused that harm, and that the defendant's conduct was one against which the law affords a remedy. 278

Land use in surrounding rural areas affects the judicial balancing as to whether or not there are nuisances emanating from sewage sludge application. Courts attempt to strike a balance between the plaintiff's right to reasonably use and enjoy his land and the farmer's right to make a reasonable use of his. 279 Implicitly, the harm to the plaintiff is weighed against the utility of the agricultural conduct. Rural landowners are expected to tolerate odors and activities that might be characterized as nuisances in nonrural areas. The question then becomes: at what point do the effects of these activities become so overwhelming in rural areas that they become a nuisance? 280 Common law nuisance is a confusing doctrine. 281 It is possible for courts to enjoin agricultural activities when their smells become nuisances by interfering with the rights of others to enjoy their property. 282 Nuisance actions allow citizens and government to abate activities believed to be injurious to health, safety, and welfare. 283

Historically, courts have considered a variety of factors in determining whether a farmer's practices deprive neighbors of the reasonable use and enjoyment of their land. Such factors include the character of the surrounding area, the location and proximity of the farm to plaintiff's residence, the intensity and volume of odors, and generally, the overall interference with plaintiff's well being. 284 For years, "coming to the nuisance" was a defense considered by the courts, and was a factor to be weighed in determining the scope of reasonable use. 285 Despite this defense, courts usually upheld nuisance actions

278 See Plater et al., supra note 157, at 166.
279 "In every case, the court must make a comparative evaluation of the conflicting interests according to objective legal standards, and the gravity of the harm to the plaintiff must be weighed against the utility of defendant's conduct." William L. Prosser, Law of Torts 596 (4th ed. 1971).
280 See Woods v. Kahn, 420 N.E.2d 1028, 1031 (Ill. App. Ct. 1981) (holding that the odors and insect problems caused by defendant's chicken farm overwhelmingly interfered with the rights of others to enjoy their property, even though the area was zoned agricultural).
281 "[I]t has meant all things to all men and has been applied indiscriminately from an alarming advertisement to a cockroach baked in a pie." Prosser, supra note 279, at 571 (citations omitted).
282 See Woods, 420 N.E.2d at 1031.
283 See id.
against farmers.286 Recently, however, states have deprived the courts of this power by abolishing the nuisance claim as a cause of action for adjacent landowners through the enactment of so-called "Right to Farm Acts."287

Whereas Right to Farm Acts provide protection against nuisance actions, they do not offer protection against actions to prohibit land application of sewage sludge, if this practice is considered an abnormally dangerous activity. The concept of imposing liability on a landowner who engages in an abnormally dangerous activity evolved because theories of trespass and nuisance did not adequately protect an adjacent landowner's property rights.288 Trespass only applied to actual invasions of the plaintiff's property, while nuisance covered only activities on defendant's property that continually interfered with plaintiff's use and enjoyment of land.289 Neither cause of action applied to noncontinual activity on defendant's property that indirectly interfered with plaintiff's property rights. Thus, the common law doctrine of strict liability for abnormally dangerous activity developed to fill the gaps.290

The abnormally dangerous activity doctrine imposes strict liability on those who, for their own benefit, introduce extraordinary risk of harm into the community, despite the possible social utility of their activities.291 The rule reflects a policy determination that such "enterprise[s] should bear the costs of accidents attributable to highly dangerous activities."292 Because some conditions and activities can be both hazardous and of infrequent occurrence, the risk of the loss is justifiably allocated as a cost of business to the enterprise that en-

287 This has prompted what some call a rejuvenation of the "coming to the nuisance defense" for farmers. See id. at 428.
289 See id.
290 See Rylands v. Fletcher, L.R. 1 Ex. 265, 279 (1866) ("[T]he person who for his own purposes brings on his land and keeps there anything likely to do mischief if it escapes, must keep at his own peril, and if he does not do so, is prima facie answerable for all damage which is the natural consequence of its escape.").
291 See T & E Indus., 587 A.2d at 1256–57.
gages in such conduct. Elements of a strict liability claim differ from elements of other tort claims, such as nuisance, negligence, or trespass, in that defenses (such as absence of civil intent) are not available.

The following sections include an analysis of whether Right to Farm statutes protect farmers from liability for land application of sewage sludge based on nuisance and abnormally dangerous activity challenges. An abnormally dangerous activity cause of action may be the foremost strategy in the plaintiff’s fight against the land application of sewage sludge. Although common law strict liability varies by jurisdiction, the criteria for determining whether sewage sludge application may be an abnormally dangerous activity remain constant. This analysis focuses primarily on the abnormally dangerous activity doctrine under New Jersey common law. New Jersey law has been chosen as the focus of this analysis because: (1) a thorough examination of state common law on this point would be beyond the scope of this article; and (2) the New Jersey law of abnormally dangerous activities is comparatively well developed, in contrast to that of other states. One thing is certain in all jurisdictions: if sewage sludge application is determined to be abnormally dangerous under the applicable common law, then strict liability may be imposed on farmers, contractors, and even POTWs who undertake such operations. This would in turn make land application a very risky venture.

Before an analysis of Right to Farm protection can proceed, it is important to note that plaintiffs may be confronted with issues of sovereign immunity if they decide to bring a cause of action against POTWs.

1. Issues of Sovereign Immunity

POTWs may claim sovereign immunity against suits based on the common law causes of action discussed above. Public entities may be

---

293 The rule seeks to internalize externalities. See id. at 556; see also Berg v. Reaction Motors, 181 A.2d 487, 494 (N.J. 1962) (holding that action by property owners for compensatory and punitive damages to their property resulting from the testing of a rocket engine should in all fairness be absorbed by defendant as a cost of doing business).


295 Absolute liability for nuisance is recognized by New Jersey common law where defendant carries on an abnormally dangerous activity in an inappropriate place or where the enterprise involves so great a risk to its surroundings that its location may be considered unreasonable. See New Jersey Transp. Dep’t. v. PSC Resources, Inc., 419 A.2d 1151, 1161 (N.J. Super. Ct. Law Div. 1980).
held liable only as permitted by their jurisdiction's Tort Claims Act. While there has been a steady and growing movement away from sovereign immunity, the general rule, which is still applied throughout the majority of states, is that immunity exists in tort actions against the state and substate governmental entities such as POTWs.\(^{296}\) In their respective Tort Claims Acts, all of the states have given limited consent to be sued in certain situations, however.\(^{297}\) For example, in New Jersey, POTWs are immune from claims unless a specific provision in the Tort Claims Act provides for the imposition of liability.\(^{298}\) Thus, in New Jersey, broad discretionary immunities have been given to uniquely governmental functions, and public entities are not liable for injuries resulting from the exercise of their discretion.\(^{299}\) The reasoning behind this immunity is that high-level decisions calling for the exercise of official judgment or discretion must not be subject to the threat of tort liability.\(^{300}\) However, ministerial decisions, such as the selection of independent contractors, are not protected. In Kenney v. Scientific, Inc., residents claimed that personal injury and property damage was caused by the operation of local landfills which accepted hazardous waste.\(^{301}\) With regard to the public waste generators, the court found that they could not be held strictly liable because of the sovereign immunity doctrine.\(^{302}\) However, the court also held that the public waste generators could be liable for negligence in connection with the selection of an independent contractor to haul waste, if a low-level ministerial decision was involved in that selection.\(^{303}\) Thus, sovereign immunity will not protect a POTW that hires negligent independent sewage sludge contractors, unless that decision was made at a high level (which is unlikely). Even so, the doctrine probably would protect a POTW if there is no evidence of negligence and the court decides that land application of sewage sludge is a discretionary disposal decision.


\(^{297}\) Alaska, Arizona, California, Colorado, Hawaii, Illinois, Iowa, Nevada, Oregon, Michigan, Rhode Island, Texas, Utah, Wisconsin, Vermont, Washington and New York have abolished their immunity over the past ten years. See id.


\(^{299}\) See id. § 59:2–3(a).


\(^{301}\) 497 A.2d 1310, 1313 (N.J. Super. Ct. Law Div. 1985)

\(^{302}\) See id. at 1325–26.

\(^{303}\) See id. at 1326.
Where liability of a public entity is based on negligence, the entity must be found to be “palpably unreasonable” before liability can attach.\(^\text{304}\) Thus, in Kenney, with regard to the landfill owned and operated by the township, the court held that the strict liability theory could not be applied because of the doctrine of sovereign immunity.\(^\text{305}\) The court also found, however, that the township might be liable for a dangerous condition created on the property, but only if it could be shown that the township acted in a “palpably unreasonable” fashion in its operation of the landfill.\(^\text{306}\) This higher standard of negligence provides some limited protection for public entities, because it is difficult to define what is palpably unreasonable in the context of discretionary activities.

Before protection is provided, a POTW must actually prove that it engaged in discretionary activity of the type immunized by Tort Claims Acts. In Birchwood Lakes Colony Club v. Medford Lakes, residents sued a borough for compensatory damages arising from contamination of a private lake by nontoxic effluent from the borough’s sewage treatment plant.\(^\text{307}\) The court held that the defendant had to show that the discharge of pollutants was a discretionary activity protected under the Tort Claims Act. If no showing of discretionary conduct is made, protection is not warranted.\(^\text{308}\)

The New Jersey Tort Claims Act also immunizes a POTW if it actively plans or designs, with the New Jersey Department of Environmental Protection or other regulatory authorities, the activity that is responsible for the pollution.\(^\text{309}\) Thus, if a POTW constructs its sewage sludge treatment facility in cooperation with state regulatory authorities, it appears that the entity would not be liable for any pollution caused by such a facility. However, it is unclear whether this immunity would extend to pollution caused by the land application of products from such a facility.

An exhaustive discussion of sovereign immunity is impracticable for the purposes of this article, especially since the doctrine varies by jurisdiction. Any cause of action against a POTW, however, will likely raise immunity issues. Thus, sovereign immunity is just one of many

---

\(^{305}\) See Kenney, 497 A.2d at 1317.
\(^{306}\) See id. at 1318.
\(^{307}\) 449 A.2d 472, 474-75 (N.J. 1982).
\(^{308}\) See id. at 478-79.
legal obstacles that potential plaintiffs must consider. Right to Farm protection for farmers is another issue which may preclude suits.

2. Can Right to Farm Statutes Protect Farmers from Nuisance Liability?

Most states have eliminated nuisance as a cause of action for adjacent landowners by enacting Right to Farm Acts. Right to Farm statutes typically define agricultural activity broadly to afford protection against nuisance actions for every conceivable agricultural operation (including sewage sludge application).[^310] For example, Michigan law defines "farm operation" in terms of all the potentially undesirable activities it encompasses: "noise; odors; dust; fumes; operation of machinery and irrigation pumps; ground and aerial seeding; the application of chemical fertilizers; conditioners, pesticide insecticides and herbicides . . . ."[^311] A few states avoid such broad definitions; for example, Tennessee limits protection to feedlots, dairy farms, and egg production houses, and the Connecticut Act only provides protection for certain agricultural nuisances, such as odors from livestock or fertilizer (sewage sludge).[^312] When farming activities change over time, however, it becomes less clear if protection is extended.[^313] For instance, the North Carolina Right to Farm Act does not protect farms that have substantially changed in character. In *Durham v. Britt*, a North Carolina court of appeals held that it did "not believe the legislature intended [the act] . . . to cover situations in which a party fundamentally changes the nature of the agricultural activity which had theretofore been covered under the statute."[^314] The court went on to suggest that a fundamental change could consist of a change in operation (such as a switch from diary to hog farming), but mentioned nothing about changes in agricultural practices, such as using sewage sludge. The New Mexico Right to Farm Statute does not apply when there is a change in operation that would create a nuisance,[^316] and in Utah, protection is not provided for agricultural operations that increase or intensify a nuisance outside of protected agricultural ar-

[^310]: See Grossman & Fischer, supra note 178, at 125.
[^313]: Protection is normally extended only to well established agricultural activities. See Grossman & Fischer, supra note 178, at 125-27.
[^314]: 451 S.E.2d 1, 3 (N.C. App. 1994) (emphasis omitted).
These statutes suggest that a farmer's adoption of sewage sludge application may not be covered under the relevant Right to Farm Act. However, the courts generally interpret these statutes in light of typical agricultural practices. Thus, land application of sewage sludge would most likely be covered, since beneficial reuse has become more of a norm for agricultural operations. Moreover, land application of sewage sludge gives an economic benefit to farmers, in turn enabling them to be more competitive in a farm economy increasingly less supported by federal subsidies.

Right to Farm Acts work to insulate farmers from nuisance liability by codifying coming to the nuisance defenses, but at the same time they often attempt to afford environmental protection to neighboring landowners. Because adjacent landowners' health and safety are most often protected by specific environmental laws and regulations, the relationship between these laws and Right to Farm Acts is a significant one. Right to Farm Acts may deprive neighbors of the ability to challenge agricultural operations by means of nuisance suits; nevertheless, the various Right to Farm Acts around the country do try to incorporate goals of environmental protection by relying on three different statutory structures.

The first group of acts condition Right to Farm protection on compliance with applicable environmental laws and regulations. These statutes proclaim that noncompliance will subject farmers to enforcement actions and nuisance liability. For example, in Kansas, an agricultural activity is not a nuisance if it is consistent with good agricultural practices (defined as being in conformity with federal, state, and local laws). Vermont's Right to Farm Law also provides protection for agricultural activities that conform to federal, state, and local regulations, and are thus deemed "good" agricultural practices.
It seems that because most sewage sludge application operations are carried out in conformity with the Part 503 Rule, such operations would be protected under these statutory schemes. However, in Vermont, the presumption that an activity is a good agricultural practice if in conformity with regulations is rebuttable with a showing that the activity is substantially adverse to public health and safety. The language in the Vermont Right to Farm Act enhances protection for neighboring landowners from odors caused by sewage sludge application. State regulations prohibit air pollution. In these regulations, "air contaminant" includes odorous substances. The regulations forbid discharging "air contaminants" that cause a nuisance, and specifically forbid discharge of any objectionable odors beyond the property line. Thus, because the Right to Farm Act provides that farmers must comply with state regulations, and because so many nuisance suits involve noxious odors, a severe limitation is placed on the efficacy of the Right to Farm Act to protect farmers who choose to land-apply sewage sludge.

The second group of Right to Farm laws focuses on maintaining public health and safety as a method of environmental protection, rather than on compliance with environmental regulations. For example, the Florida and New York Right to Farm Acts do not apply when a nuisance threatens public health and safety. New Jersey's Right to Farm Act also does not provide protection for nuisances that pose a direct threat to public health and safety.

Lastly, the third approach taken by Right to Farm Acts to provide protection for adjacent landowners is to allow the retention of remedies for personal injury when negligent farming operations result in pollution. These statutes, based on the North Carolina Right to

---

322 See id. Unfortunately, in light of the ongoing controversy surrounding sewage sludge application, it is unclear whether land application under the Part 503 Regulations is adverse to public health and safety.
323 See id.
325 See id.
326 See Grossman & Fischer, supra note 178, at 145.
327 See id. at 145–46.
329 See N.J. Stat. Ann. § 4:1C–26 (West 1998) (which combines a focus on public health and safety with requirements that activities be in conformity with federal, state, and local laws).
Farm Act, expressly state that their intention is not to limit the right of a person to "recover damages for any injuries or damages sustained by them on account of any pollution of, or change in condition of, the waters of any stream or on account of any overflow of lands." Consequently, these states do not provide nuisance protection for activities that may cause water pollution, and they allow private nuisance actions relating to water pollution or flooding.

Some Right to Farm laws also protect farmers from lawsuits based on causes of action other than nuisance. Numerous states have also explicitly prohibited causes of action for negligent activity on the part of farmers. Thus, farmers can be protected from liability based on an interference with the use and enjoyment of another's land, whether the cause of interference is an unreasonable intentional action or an unintentional but negligent one. For example, the piling up of manure, which subsequently contaminates a neighbor's well and is clearly negligent, would be protected under these statutes.

The exclusion of nuisance and negligence claims does not leave adjacent landowners without remedy, however. The above example of well pollution may constitute a continuing trespass, because it is a physical invasion by tangible matter. It is important to note that the model Right to Farm Acts, discussed above, do not provide protection against trespass actions by adjacent landowners.

Adjacent landowners may wish to facially challenge Right to Farm legislative protections. In the recent case of Bormann v. Board of Supervisors In and For Kossuth County, the Iowa Supreme Court held that Iowa's Right to Farm Act, which provides nuisance immunity to agricultural operations, was unconstitutional and invalid because it created a taking without just compensation. Where this leaves state nuisance protection for farmers is unclear. The court in

---

332 The North Carolina law provides the right to recover damages, but does not mention injunctive relief. Thus, one interpretation, in terms of nuisance law, may be that a farmer could continue to cause a nuisance as long as he compensates his victims. See Grossman & Fischer, supra note 178, at 146 n.220.
333 See IND. CODE ANN. § 34-1-52-4(g) (West 1998); KY. REV. STAT. § 413.072 (Michie 1996); MD. CODE ANN., CTS. & JUD. PROC. § 5-403 (1998).
334 But see IOWA CODE ANN. § 352.11(1)(a) (West 1997) (stating that protection does not apply if nuisance results from negligent farm operations).
335 This hypothetical mirrors the factual scenario in Van Brocklin v. Gudema, 199 N.E.2d 457, 459 (Ill. App. Ct. 1964), which was decided before the state enacted Right to Farm protection.
336 584 N.W.2d 309 (Iowa 1998), cert denied 119 S. Ct. 1096 (1999) (passing on the constitutionality of IOWA CODE § 352.11(1)(a)).
Bormann held that the County Board of Supervisors' approval of a landowner's application for an agricultural area triggered the immunity provision in the state's Right to Farm Act and resulted in condemnation by nuisance of neighbors' properties without just compensation. The court held that the immunity resulted in the Board's taking of an easement in the neighbors' properties for the benefit of the applicant, by entitling the applicant to perform activities on its property that would constitute a nuisance, were it not for the easement. The court thus held 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 just compensation.

Compare this ruling to Judge Jasen's dissent in Boomer et al. v. Atlantic Cement Co., in which he stated that the permanent impairment of private property for private purposes is not authorized in the absence of clearly demonstrated public benefit and use. According to Judge Jasen, private condemnation in the form of permanent damages should only be permitted when the public is served by the taking of the property. The Boomer dissent concluded that the promotion of the polluting cement company's interests had no public use or benefit. Did the Bormann court say much the same thing about Iowa's Right to Farm Statue? It can be argued that the easement created in Bormann did not solely benefit the applicant, but rather was a codification of the coming to the nuisance doctrine. The fact that it created an easement is not extraordinary. After all, many legislative enactments create easements. Perhaps what gave the court difficulty was the actual structure of Iowa's Right to Farm Act. Iowa's statute not only codified coming to the nuisance, but also provided protection to farming operations, regardless of when they were established or whether they had expanded. It is conceivable that the court was

---

337 See id. The Board rejected the application for a permit the first time, and approved by a coin toss the second time, and was thus held to be arbitrary and capricious. See id. at 311–12. The court could have stopped here, but in dictum, went on to address the constitutionality of the statute. See id. at 313.

338 See id. at 316–22.

339 See id. at 315–16. However, it is important to note that no such nuisance had yet occurred.


341 See id. at 876.

342 See id. at 876–77.

343 See IOWA CODE ANN. § 352.11(1)(a) (West 1997) ("[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.").
worried about parcels being deemed agricultural after established residential communities had already been built. If this is true, then Bormann's precedential effect may be limited.

If facial attacks on state Right to Farm statutes are limited to statutes providing very broad protection from nuisance actions, like Iowa's, then a preferable cause of action for adjacent landowners may be to challenge sewage sludge application operations as abnormally dangerous or "ultra hazardous" activities under the common law. This is a possible means of circumventing Right to Farm protections, because Right to Farm laws provide no explicit immunity for activities deemed abnormally dangerous. The question is: could sewage sludge application to farmland be characterized as such an activity?

3. Sewage Sludge Application as an Abnormally Dangerous Activity: Defeating Right to Farm Protections?

The Restatement (Second) of Torts sets forth six factors in determining whether an activity is abnormally dangerous and thus subject to strict liability:

a) the existence of a high degree of risk of some harm to the person, land or chattel of others;
b) the likelihood that the harm that results will be great;
c) the inability to eliminate the risks by the exercise of reasonable care;
d) the extent to which the activity is not a matter of common usage;
e) the inappropriateness of the activity to the place where it is carried on; and
f) the extent to which its value to the community is outweighed by its dangerous attributes.

Relying upon the Restatement definition, courts in New Jersey make a factual determination as to the abnormally dangerous character of an activity on a case by case basis. In determining whether the danger is abnormal, the factors listed above are all to be considered, and are all of importance. Because of the highly factual nature of the

344 See generally Plater et al., supra note 157.
345 Of course, states may amend their Right to Farm Statutes to include immunity from suits based upon abnormally dangerous activity.
346 See Restatement (Second) of Torts §§ 519, 520 (1976).
347 Id. § 520.
inquiry, it is impossible to reduce abnormally dangerous activities to a single definition. But one maxim controls throughout the caselaw: those who poison the land must pay for its cure.

It cannot be predicted with certainty whether courts will hold land application of sewage sludge to be an abnormally dangerous activity. As articulated by the Supreme Court of Washington:

In determining whether the danger is abnormal the factors listed in Clauses (a) to (f) of [Restatement Section 520] are all to be considered and all are of importance . . . . The essential question is whether the risk created is so unusual, either because of its magnitude or because of the circumstances surrounding it, as to justify the imposition of strict liability for the harm which results from it, even though it is carried on with all reasonable care.

It is at least arguable that a court might consider sewage sludge application to be an abnormally dangerous activity. The risk of negatively influencing the property values of neighboring landowners is high. Moreover, although government agencies are recommending the land application of sewage sludge in compliance with Part 503, a substantial body of credible scientific opinion has warned that the Part 503 regulations are insufficiently strict to protect public health. If these authorities are correct, the resulting harm from land application of sewage sludge may indeed be grave. In addition, if the Part 503 regulations are too weak, compliance with them—which would constitute “reasonable care”—would still not eliminate the risk.

349 See id.
352 This body of scientific opinion alone may be enough to render land application of sewage sludge an abnormally dangerous activity, because the cause of action for abnormally dangerous activity does not require a risk to public health from a “toxic” pollutant. In Langan, pesticides were legally sprayed on cropland from a helicopter, but an unpredictable gust of wind caused the substances to drift onto plaintiff's farmland. See id. Plaintiffs were organic farmers, and the contamination of their land consisted of the deposit of pesticide residues on their crops, even though these residues were below the tolerances set by U.S. Department of Agriculture. See id. Subsequently, plaintiffs destroyed the contaminated crop. See id.
353 The potential “toxicity” of sewage sludge is a function of its land application rates over time. Courts have imposed liability for abnormally dangerous activities on land applications of substances that cumulatively cause damage at a later date. See, e.g., Branch, 657 P.2d 267 (defendant's continuous depositing of wastewater from oil drilling in gravel pit on its own land, which reached plaintiff's well over a year later, was held to be an abnormally dangerous activity).
354 Compliance with a permit is not a defense to a common law action for pollution damages. See Plater et al., supra note 157, at 173.
Also supporting an argument that land application is abnormally dangerous is the fact that it is not yet viewed as a common use of sewage sludge. This is because of the negative perceptions of this activity by the general public. Whether land application is inappropriate may also depend on public perceptions, as well as on whether the land application is widespread in the particular area. Finally, with regard to the value of land application of sewage sludge to the community, courts may find that the consequent risks to public health and property value outweigh the ecological and economic benefits.

A court's characterization of a particular activity as "abnormally dangerous" is, in effect, a policy decision that one who conducts an extraordinarily unusual activity with potentially dangerous effects should be strictly liable for any damage that occurs. It would certainly not be frivolous to allege that land application of sewage sludge is such an activity.

The New Jersey Supreme Court, in State Department of Environmental Protection v. Ventron Corp., stated that the handling of toxic waste such as mercury is an abnormally dangerous activity and that a "landowner is strictly liable to others for harm caused by toxic wastes that are stored on his property and flow onto the property of others, . . . [even if the] one disposing of toxic waste may be performing an activity that is of some use to society." This rule has been extended to the handling of substances containing toxic wastes, even if a defendant had no knowledge that the substance contained such wastes. Thus, lack of knowledge was not an available defense under the abnormally dangerous activity doctrine. However, the so-called "state of the art" defense, that the risk of the activity was scientifically unknowable at the time, seemed more appealing to the court in T & E Industries, Inc. v. Safety Light Corp. The court noted that the availability of this defense to strict liability claims for abnormally dangerous activities posed an interesting question, but ultimately refused to resolve the issue. The court noted that requirements such as knowledge and foreseeability smack of negligence, and may be inappropriate in the realm of strict liability. However, the court

355 See generally id. 157–232.
356 468 A.2d at 157, 160; see also T & E Indus., 587 A.2d at 1261 (holding that the processing, handling, and storage of radium constituted an abnormally dangerous activity).
358 587 A.2d at 1259–60.
359 See id. at 1260.
360 See id.
went on to hold that the defendant, who processed, handled, and disposed of radium, *should have known* about the risks of its activity, and this constructive knowledge was enough to satisfy any such knowledge requirement.\footnote{361 See *id*. Radiation at the site exceeded those levels permitted under government health regulations, and the property was designated as a Superfund site. See *id*.}

In addition to a common law basis for the imposition of strict liability regarding abnormally dangerous activities, New Jersey state statutes and federal laws also impose liability without fault for such acts.\footnote{362 See Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. \$ 9601 (1994); Spill Compensation and Control Act, N.J. Stat. Ann. §§ 58:10A–1, :23.11(g) (West 1998).} However, these statutes explicitly exclude sewage and sewage sludge from coverage. For example, the New Jersey "Spill Act," which is modeled after the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), states that "sewage and sewage sludge shall not be considered as hazardous substances for the purpose of this act."\footnote{363 N.J. Stat. Ann. §§ 58:10-23.11(b), (k).} Does this mean that sewage sludge land application can never be considered an abnormally dangerous activity under common law? The answer is probably "no," because statutory regulatory standards are not absolute defenses in common law actions.\footnote{364 See PLATER ET AL., supra note 157, at 173.} The New Jersey "Spill Act" expressly provides that its remedies are in addition to common law remedies; thus common law characterizations of abnormally dangerous activity remain valid.\footnote{365 See N.J. Stat. Ann. §§ 58.10-23.11(b), (k).}

As described above, it is arguable that sewage sludge is a potentially toxic substance that may be abnormally dangerous. If the Part 503 permit incorporates the standard of reasonable care, then it may not be sufficiently protective. Currently, the Part 503 regulations contain no standards or testing requirements for organic chemicals.\footnote{366 However, it is rumored that EPA will establish numerical limits for dioxins, furans, and PCBs. See supra note 124 and accompanying text.} PCBs are an example of a class of organic contaminants generally found at low levels, but which can be concentrated at high levels in some sewage sludges.\footnote{367 See HARRISON ET AL., supra note 133, at 24–25.} PCBs are not regulated under Part 503 because they are no longer manufactured in the United States. But existing PCBs, like dioxins and many other chlorinated synthetic organic chemicals, are persistent, slow to degrade, and can bioaccu-
mulate. Although the Ventron case dealt with acutely hazardous materials, unlike sewage sludge, dicta in Ventron might indicate that excessive cumulative loadings in sewage sludge might be considered abnormally dangerous: “the waste dumped may react synergistically with elements in the environment, or other waste elements, to form an even more toxic compound.’’ Thus, if these organic chemicals can be shown to have negative, synergistic effects, a court in a particular case may hold that sewage sludge application is an abnormally dangerous activity.

If this line of reasoning is followed, and sewage sludge application is deemed an abnormally dangerous activity, Right to Farm Laws could not be relied upon to protect farmers from private tort actions. The abnormally dangerous activity doctrine imposes strict, joint and several liability upon all actors. Generators, contractors, and farmers might all be held jointly and severally liable for any damages. Joint and several liability, imported by CERCLA from the common law, shifts the liability to any identifiable party that participated in the activity. There is no apportionment of harm, and defendants are left to sue other responsible parties for contribution. Given the limited ability of municipalities and most farmers to pay large sums of money in damages, this liability scheme would have a chilling effect on land application of sewage sludge.

Under such a liability scheme, it seems that indirect dischargers would be considered part of the disposal chain and thus could be held strictly liable. The question then becomes: how far down the chain of causation can liability extend? The obvious defense raised by indirect dischargers would be that losses were not foreseeable and thus too

---

368 More than 50% of dioxins and furans were still present in soils 20 years after sewage sludge application. See Michael S. McLachlan et al., Polychlorinated Dibenzo-P-dioxins and Dibenzofurans in Sewage Sludge: Sources and Fate Following Sludge Application to Land, 185 SCI. OF THE TOTAL ENV’T 109, 118 (1996).


370 See Harrison et al., supra note 133, at 34. (explaining possible synergistic effects).

371 This would be the case unless state courts hold that even though abnormally dangerous activities are not explicitly included in Right to Farm Statutes, they are nevertheless implicitly immunized from liability by them. But such an interpretation would violate the inclusio unius principle of statutory construction: that whatever is not specifically mentioned is presumed to be excluded.

372 See Plater et al., supra note 157, at 196.

373 See 42 U.S.C. § 9607(a).

374 Although under CERCLA, EPA has limited its efforts to recovering a “fair” share from municipalities when other parties are involved. See Plater et al., supra note 157, at 811.
remote for them to be held liable. However, given EPA's preference for beneficial reuse of sewage sludge, it could be argued that those indirect dischargers could have reasonably foreseen that the sewage sludge from their discharges would be applied to agricultural land. This is only one example of how complicated and unpredictable liability might become in such cases. The Conclusions and Recommendation section of this article discusses how the establishment of a compensation fund as a risk-sharing mechanism might clarify questions regarding liability.

It is also possible that courts will not extend the doctrine of abnormally dangerous activities to sewage sludge land application. If a court decides that knowledge is a requirement under the abnormally dangerous activity doctrine, it may then decide that farmers who place their trust in compliance with Part 503 should be immunized. Given the scientific controversy and uncertainty surrounding sludge application, it is unlikely that any farmer could have constructive knowledge as to the dangers of sludge. In *T&E Industries*, the dangers of radium were well documented, and the owner of the site knew that it had been given Superfund designation.

Even if the court decides that knowledge is not a prerequisite for a strict liability claim for an abnormally dangerous activity (as the court seemed to do in *T&E Industries*), it still may not extend the abnormally dangerous activity doctrine to sewage sludge disposal for public policy reasons—the chain of liability might be too extensive. Farmers, contractors/transporters/applicators, as well as indirect dischargers and POTWs, may be liable because the liability for abnormally dangerous waste is absolute from the moment the waste is generated until the waste produces harm. Without workable risk-

---

375 See generally *Pruit v. Allied Chem. Corp.*, 523 F. Supp. 975 (E.D. Va. 1981) (holding that commercial fisherman can recover against a chemical company for its pollution of the Chesapeake Bay, but plaintiffs who purchased and marketed seafood could not recover because their damages were insufficiently direct to be legally cognizable).


377 Where work to be done is "ultra hazardous," there is absolute liability on the part of the person engaging the services of the independent contractor, regardless of fault. *See Majestic Realty Assocs., Inc. v. Toti Contracting Co.*, 153 A.2d 321, 324, 326 (N.J. 1959).

378 If there is liability for the hauler/transporter, it is only for the period that the hauler/transporter possesses the waste. *See Kenney*, 497 A.2d at 1327 (N.J. Super Ct. Law Div. 1985).

379 "[A] company [municipality] which creates the Frankenstein monster of abnormally dangerous waste should not expect to be relieved of accountability for the depredations of its creature, merely because the company entrusts the monster's care to another, even an independent contractor." *Id.* at 1320.
sharing mechanisms for dealing with widespread liabilities, an extension of the abnormally dangerous activity doctrine to land application of sewage sludge might ultimately discourage this mode of disposal.\textsuperscript{380}


Once the Part 503 EQ sewage sludge criteria are met, sewage sludge-derived material can be deemed a sewage sludge product, which can be registered with the Department of Agriculture just like any normal fertilizer or soil conditioner.\textsuperscript{381} Proponents of sludge-derived products argue that their production will reduce a POTW's potential sludge management liability. When sludge is used to produce a product, title to the sludge might be passed from the POTW to the EQ product manufacturer, thus insulating a POTW from liability.\textsuperscript{382} The sludge would be treated as any other raw material used in the production of a product. In such a situation, POTWs would arguably be relieved of responsibility for any future mismanagement of the sewage sludge.\textsuperscript{383} Proponents also argue that transferring sewage sludge to companies making EQ sewage sludge products would relieve POTWs from a substantial amount of the Part 503 burden.\textsuperscript{384} For

\textsuperscript{380} Furthermore, strict liability for abnormally dangerous activity is not limited to neighboring property owners, as the liability for harms caused by abnormally dangerous activity does not cease with the transfer of the property. Under New Jersey law, a landowner who conducts an abnormally dangerous activity on his property is also strictly liable to subsequent owners of that property for any harm caused by that activity. The doctrine of caveat emptor is not a defense. Landlords, under certain conditions, can also be held liable. Subsequent tenants, under the common law, have a cause of action for strict liability against the landlord for a prior tenant's environmental contamination of the property, even though the landlord did not himself pollute the site (especially if he actively administered the leasehold). Thus, the nature of farmland assessment as we know it may drastically change. \textit{See infra} notes 488–90 and accompanying text.

\textsuperscript{381} \textit{See} Holgate Property Assocs. v. Township of Howell, 679 A.2d 613, 617–18 (N.J. 1996) (holding that the approval of a permit exemption for a sludge-derived product site by the Department of Environmental Protection did not require formal public notice procedures because sludge-derived products are essentially regulated as fertilizers).

\textsuperscript{382} \textit{See supra} notes 382–84 and accompanying text.


\textsuperscript{384} \textit{See}, e.g., Memorandum from Environmental Counsel at the Law Firm of Spengler Nathanson to N-Viro International Corporation, \textit{Municipal Sewage Sludge Management—Understanding, Minimizing and Avoiding Liability} 15–16 (Sept. 1995) (on file with authors).
example, permit requirements would only contain conditions up to the
time the POTW transfers the sludge. No Part 503 land application
requirements would apply. Therefore, there would be less likelihood
of Part 503 permit violations, on the part of the POTW, that could
trigger potential CERCLA liability (as discussed below). Further­
more, the sale of the final EQ sewage sludge product to a third party
might arguably insulate both the POTW and the product manufac­
turer from CERCLA liability as well.

On the other hand, if sewage sludge is treated as a crop care
product, the possibility arises that companies producing such a pro­
duct (which may be POTWs) will be open to product liability actions.
Like companies that manufacture fertilizers, the manufacturers of
sewage sludge-derived products may be held liable for personal injury
or property damage allegedly caused by their products.

Generally, fertilizer product liability suits have been based on com­
mon law theories of negligence, breach of warranty (implied or ex­
press), strict liability in tort, or a combination thereof. A negligence
theory of recovery focuses on the manufacturer's conduct, i.e., the
manufacturer was allegedly at fault in creating the defect in the
product and it knew, or should have known, about the defect and yet
sent the product into the stream of commerce. Thus, in design or
warning defect cases, the issue is the reasonableness of the manufac­
turer in marketing a product and in warning, or failing to warn, of the
dangers associated with the use/misuse of that product. In strict
liability cases, the focus is on the product itself, and the manufacturer
is deemed to know about the harmful propensities of the product.
The implied warranty theory of recovery has typically been used
where a product malfunctions or is simply unfit for use. This theory
of recovery holds sellers liable to their immediate buyers, but is
considered largely irrelevant in design or warning defect cases.

That a product was fit for its intended use has no bearing on whether

---

386 In addition, the conversion of the sewage sludge could also decrease a POTW's potential exposure to natural resource damages.
387 See id. § 2[a].
390 See DREIER ET AL., supra note 300, at 1–3.
391 See id.
or not the manufacturer should be held liable for injuries resulting from the design or failure to warn. Finally, the express warranty theory of recovery is largely statutory, and is governed by the Uniform Commercial Code.

Some states have superseded common law theories of recovery with Product Liability Acts. New Jersey's Product Liability Act (the Act) has the effect of creating a unified, statutorily defined theory of recovery that is, for the most part, identical to strict liability. Under the Act, negligence and breach of warranty claims are no longer viable as separate claims for harm caused by defective products. If product liability actions against sewage sludge product manufacturers are subject to the provisions of acts such as New Jersey's, then the safety of sludge-derived products themselves, and not necessarily the manufacturer's conduct, would come under scrutiny and strict liability would be imposed. Once again, the scientific uncertainty surrounding the EQ criteria and criticism of EPA's beneficial reuse policy would likely play a role in litigation. However, the New Jersey Product Liability Act explicitly excludes from coverage environmental torts actions. These actions are defined as civil actions "seeking damages for harm where the cause of the harm is exposure to toxic chemicals or substances ..." Harm means physical damage to property or personal or physical illness, pain and suffering, mental anguish, or any loss of consortium or services. Thus, if sewage sludge-derived products are deemed environmentally harmful, actions brought against manufacturers for damage to property and

393 See DREIER ET AL., supra note 300, at 1-4.
397 It is likely however, that as long as a manufacturer meets Part 503 standards he would not be held liable under a strict liability theory.
398 N.J. STAT. ANN. § 2A:58C-6. At one time, the exclusion was only intended to encompass actions involving the pollution of ambient air and of streams and other bodies of water, dumping of toxic wastes, and similar activities ordinarily regarded as environmental torts. See DREIER ET AL., supra note 300, at 8. This was rejected in favor of a broader reading of the statute to include occupational exposures within the definition. See id. (citing New Jersey Assembly Insurance Committee Statement to Senate, S. REP. NO. 2805 (1987)).
399 Id. § 2A:58C-1.
400 See id.
persons might be considered environmental torts, and thus might be excluded from coverage under the Act.

Whether EQ products are harmful to crops and humans remains controversial. But, assuming that damage from sewage sludge product application occurs, and it can be shown that the product was environmentally harmful, a product liability action would not be completely barred under the environmental tort exclusion of the Act. Instead, the action would be governed by that jurisdiction's common law theories. For example, in *Macrie v. SDS Biotech Corp.*, where an employee of a produce broker suffered injury from contact with a fungicide, his action against the manufacturer for inadequate warning was excluded from coverage under the Act because it involved an "environmental tort," but he was not foreclosed from bringing a common law failure to warn claim against the manufacturer. Thus, common law theories of recovery still play a role in shaping product liability actions against manufacturers of crop care products, even within a statutory context.

Courts have reached different results as to whether a property owner may recover damages in a products liability action for injuries to his property caused by the application of fertilizers or similar products. Most theories of recovery in this area involve either express or implied warranties of quality given by the seller or manufacturer. Naturally, if a sewage sludge product does not meet Part 503 standards, is marketed as EQ, and then it causes injury, the manufacturer would have breached its duty to consumers. But more interesting to consider is what happens if sewage sludge that meets EQ standards causes injury? As is often the case, crop damage and causation issues will become an issue of expert testimony and scientific evidence. Courts have sometimes allowed recovery for personal injuries caused

---

402 See Patterson v. Orangeburg Fertilizer Co., 108 S.E. 401, 405 (S.C. 1921) (manufacturer of fertilizer erroneously marketed as free from deleterious elements violated its implied warranty).
403 See, e.g., Braly v. Midvalley Chem. Co., 192 Cal. App. 2d 369 (1961). In *Braly*, the plaintiff introduced evidence and expert testimony that his cotton crop was damaged by fertilizer burn, while the defendant introduced expert testimony that crop damage was due not to fertilizer burn, but instead to a fungus disease. The court affirmed a judgment in favor of the defendants, stating that although the evidence could have supported a verdict to the contrary, the court was without power to find that there was no substantial evidence which would support the conclusion by the jury. See id. at 376. In *Stone's Farm Supply*, the court held that the plaintiff farmer presented sufficient scientific evidence that fertilizer, which allegedly damaged potato crop, contained harmful phenoxy-herbicide.
by fertilizers and similar products, while in other cases they have concluded that the evidence presented was insufficient to establish liability. Courts have also found crop care product manufacturers liable for injury to livestock.

In New Jersey, even though the Products Liability Act governs most theories of recovery, the legislative committee statements make it clear that warning defect cases are also still largely covered by the common law. Due to the fact that fertilizers and other chemical products for crop care can often be toxic to human beings and some plants, the common law has typically dictated that the manufacturer, distributor, or retail seller of crop care products has a duty to warn users of the product’s foreseeable dangers that cannot reasonably be expected to be within the knowledge of users. Regardless of whether a failure to warn claim is premised upon a theory of negligence, strict liability, or breach of warranty, the duty to warn arises only where the risk of harm is foreseeable to defendant. A risk of harm is foreseeable when a defendant has actual knowledge of the dangerous propensities of the product. Furthermore, the manufacturers of herbicides and insecticides have been subject to a duty to warn where they reasonably should have known of a risk of harm, for example, where the scientific evidence of a link between exposure and an illness or disease is less than conclusive, but where there is a general link between the chemical product and a specific category of illness. “Although a manufacturer may not have had actual or constructive knowledge of a danger so as to impose a duty to warn, subsequently acquired knowledge, both actual and constructive, may obligate the manufacturer to take reasonable steps to notify purchasers and consumers of the newly-discovered danger.”

---

404 See Land O'Lakes Creameries, Inc. v. Hungerholt, 319 F.2d 352, 361 (8th Cir. 1963) (holding that a truck driver, who contacted extreme dermititis after fertilizer bag broke, could recover for personal injuries because skin contact was a foreseeable danger, even though fertilizer was not normally intended to be applied to human skin).
405 See Cone v. Virginia-Carolina Chem. Corp., 174 So. 554, 555 (Miss. 1937) (holding that plaintiff failed to prove that fertilizer was in fact dangerous, except to the extent that its dangerous condition was shown by proof of the injury).
409 See id. at 169, 173.
410 See Melancon v. Western Auto Supply Co., 628 F.2d 395, 399 (5th Cir. 1980).
In order to comply with its common law duty to warn of any dangerous propensities, the manufacturer must furnish a warning on the label that is sufficient to convey to those who might use the product notice of any inherent dangers in the product and of the possible consequences of the use or even misuse thereof. A product may be manufactured and designed perfectly, but may still be defective under the common law if it contains a hidden danger. Products with such hidden dangers are defective unless they are accompanied by a warning that includes “the directions, communications and information essential to make the use of the product safe.” This might cause a problem for sewage sludge manufacturers relying solely on Part 503 requirements. Recall that for sewage sludge and sewage sludge derived products meeting the EQ standards, no labeling or user information is required. There has been a great deal of criticism regarding the lack of information given to consumers about sewage sludge product quality. However, what is now merely criticism could in the future form the basis of a lawsuit. The common law actions against fertilizer manufacturers described above suggest that sewage sludge product manufacturers relying on Part 503 compliance may also be open to common law property damage, personal injury, and failure to warn claims based on product liability.

B. Statutory Liability

1. CERCLA

Common law strict liability has been extensively supplemented, or even supplanted, by strict liability imposed under the terms of environmental statutes. At the federal level, the most significant source of potential strict, joint, and several liability is CERCLA. Under

\[415\] However, sludge sold in bags that does not meet EQ metal limits must have a label indicating a maximum annual loading rate. See 58 Fed. Reg. 9248, 9400–01 (1993).
\[416\] See HARRISON ET AL., supra note 133, at 5, 20–21.
[417] Another aspect that might be explored is whether compliance with Part 503 will preempt state common law product liability actions, as does compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. §§ 136–136y (1994); see also Papas v. Upjohn Co., 985 F.2d 516, 518 (1993). The language of Part 503 seems to suggest that its labeling requirement is a minimum requirement.
CERCLA, generators, transporters, and disposers of hazardous substances, including those who arrange for the disposal of hazardous substances, such as POTW operators, are strictly, jointly, and severally liable for the costs of cleanup relating to releases or threatened releases of such substances.\(^\text{419}\)

At first glance, it appears that Congress and EPA have provided safe harbors in CERCLA directly applicable to the land application of sewage sludge. First, section 101(22) of CERCLA specifically defines “release” to exclude the “normal application of fertilizer.”\(^\text{420}\) Second, a party is also protected when a release of a hazardous substance is federally authorized, such as pursuant to a CWA permit.\(^\text{421}\) Lastly, in the preamble to the Part 503 Rule, EPA states that if the placement of the sewage sludge on land is considered to be either (1) the normal application of fertilizer under CERCLA, or (2) a “federally permitted release,” then CERCLA liability would not result.\(^\text{422}\) However, CERCLA’s fertilizer and federally permitted release exemptions, and EPA’s brief discussion about the exemptions’ applicability to sewage sludge land application, raise as many questions as they answer.\(^\text{423}\)

Superficially, it appears that the land application of sewage sludge falls under the fertilizer exemption to CERCLA. In addition, to the extent that sewage sludge is applied in a normal manner and within normal concentrations, that is, if land application is a “federally permitted release,” that placement would not constitute a “release” that would give rise to CERCLA liability.\(^\text{424}\) A release in compliance with a sewage sludge permit issued by EPA (or an EPA-authorized state) would thus qualify as a “federally permitted release.”\(^\text{425}\) However, if any of the requirements contained in a Part 503 permit were violated, it would appear that an associated release would not be a “federally permitted release,” and CERCLA liability would accrue. In Fallowfield Development Corp. v. Strunk, the Pennsylvania Department of Environmental Resources issued a permit to defendant Strunk, allowing him to land-apply sewage sludge as fertilizer to cornfields.\(^\text{426}\)

\(^{419}\) See 42 U.S.C. § 9607.

\(^{420}\) Id. § 9601(22).


\(^{422}\) See id.

\(^{423}\) See LUE-HING ET AL., supra note 76, at 16–21.

\(^{424}\) See id. at 21.

\(^{425}\) Most National Pollutant Discharge Elimination System (NPDES) permits are likely to be issued to POTWs, but those actors linked to them by contract would probably also be covered by this federally permitted release exclusion.

Unfortunately, the sewage sludge contained lead, trichloroethane, trichloroethylene, chloroform, and other hazardous substances, presumably in violation of the permit.\footnote{See id. at *3 (noting that other hazardous chemicals were separately dumped on the property).} Ultimately, the site was included on EPA's National Priority List and the purchasers of the property sued Strunk under several theories, including CERCLA.\footnote{See id. at *9.} The court summarily rejected Strunk's argument that his application of sewage sludge was a protected release under CERCLA, holding that "uncontradicted evidence support a finding that the sludge applied by the Strunk's [sic] was not 'normal' because it was contaminated. Accordingly, the exemption for normal application of fertilizer is inapplicable."\footnote{Id. at *70.}

If sewage sludge is applied in violation of a permit, a farmer could be liable under CERCLA. Moreover, a POTW's CERCLA fate may be entirely out of its control, and may depend on the ability of its contractors and/or farmers and state enforcement officials to ensure that 100% compliance is maintained. If a POTW's sewage sludge contractors disregard accepted management practices, then CERCLA liability may rest with the POTW.

Furthermore, neither CERCLA's language nor its legislative history indicates whether the exclusion of the initial application of a fertilizer (first release) extends to any later contamination of groundwater caused by chemicals in the sewage sludge.\footnote{See LUE-HING ET AL., supra note 76, at 16.} Thus, despite EPA's assertions to the contrary, CERCLA liability may exist in certain circumstances. For farmers, however, CERCLA liability may actually be comparatively beneficial. The CERCLA exemption does not protect them from state cleanup responsibility because the exemption does not appear to preempt state law, such as State Spill Fund cleanup requirements.\footnote{See 42 U.S.C. § 9614.} Accordingly, if farmers are subject to state cleanup laws, which are often stricter than federal requirements, they may not be able to bring in other responsible parties to contribute to cleanup costs. However, if CERCLA's joint and several liability scheme controls the cleanup, the statute may provide flexibility to allow farmers to join other potentially responsible parties.
2. RCRA

CERCLA is not the only federal statute that may impose liability upon farmers for the land application of sewage sludge. RCRA also governs disposal of "solid waste."\(^{432}\) Section 1004(27) of RCRA defines "solid waste" as "garbage, refuse, sludge from a waste treatment plant, water supply treatment plant . . . and other discarded material . . ."\(^{433}\) The use of the term "discarded material" has led to a long-standing debate about whether secondary materials that are reused and recycled are "solid waste," and thus within the jurisdiction of RCRA.\(^{434}\) While EPA has sometimes vacillated about whether other recycled materials are solid waste under RCRA, it has been the agency's consistent opinion, since 1979, that sewage sludge used as fertilizer is a solid waste.\(^{435}\)

In 1985, EPA amended its hazardous waste regulations to more clearly define when secondary waste materials (sewage sludges) are considered to be solid wastes.\(^{436}\) EPA then explicitly took the position that all sewage sludges used in a manner constituting disposal (i.e. placed on the land) were solid waste, even if used as fertilizer.\(^{437}\) It is unlikely that sewage sludge used as fertilizer pursuant to section 405 of the CWA would be listed as hazardous waste. However, under RCRA sections 7002 and 7003, as a nonhazardous solid waste, sewage sludge may still be subject to corrective action requirements if disposed of at a facility requiring a RCRA Subtitle C Permit (which would not be the case for land application to cropland or rangeland, or abatement action).\(^{438}\)

Under the citizen suit provision of RCRA's section 7002, private RCRA cleanup actions might also be brought against sewage sludge applicators by plaintiffs seeking reimbursement of cleanup costs.\(^{439}\) For years, it appeared that the citizen suit remedy provided by RCRA was limited to the abatement of the contamination, not reimbursement of cleanup costs.\(^{440}\) In *KFC Western, Inc. v. Meghrig*, how-

\(^{432}\) Id. §§ 6901-6991k.
\(^{433}\) Id. § 6903(27).
\(^{434}\) See LUE-HING ET AL., *supra* note 76, at 18.
\(^{436}\) See LUE-HING ET AL., *supra* note 76, at 18.
\(^{437}\) See 44 Fed. Reg. at 53,449.
\(^{438}\) See 42 U.S.C. §§ 6972, 6973; see also LUE-HING ET AL., *supra* note 76, at 19 (noting that the likelihood of health or environmental problems necessitating an abatement or corrective action, being caused by applications conforming to CWA Section 405 guidelines, is remote).
\(^{439}\) See 42 U.S.C. § 6972.
ever, a private cost recovery action against former service station operators was successfully maintained by a party who had cleaned up a petroleum release on that parcel.\textsuperscript{441} Thus, it appeared that private parties could obtain more complete relief under RCRA section 7002 than they could obtain under CERCLA. However, the Supreme Court reversed the Ninth Circuit, holding that because plaintiffs had already cleaned up the site, no imminent and substantial endangerment existed so as to allow for recovery of cleanup costs.\textsuperscript{442} The Court stated that the RCRA citizen suit provision was not intended to provide compensation for past cleanup efforts.\textsuperscript{443} If an imminent and substantial endangerment still exists, however, it seems that private parties may recover response costs for work taken thereafter.

Furthermore, while sewage sludge may not be listed as hazardous waste under RCRA, it may be regulated as such if it exhibits RCRA toxicity characteristics or is derived from a listed waste.\textsuperscript{444} The domestic sewage exemption in section 1004 of RCRA does not provide a defense against a potential RCRA suit based on the land application of sewage sludge—it has been a long-standing position of EPA that this “domestic sewage exemption” does not extend to residuals from the treatment of domestic sewage.\textsuperscript{445}

The potential for CERCLA and RCRA liability for sewage sludge reuse projects depends on two factors: (1) the likelihood of harm occurring that would lead to legal action; and (2) the existence of a legal basis to support such an action.\textsuperscript{446} The above discussion outlines possible statutory liability for flawed beneficial reuse projects, although research has disclosed no CERCLA or RCRA legal actions in which plaintiffs have successfully recovered cleanup costs and natural resource damages resulting from land application projects.\textsuperscript{447} But as time passes and scientific knowledge increases, it is possible that even

\textsuperscript{441} See 49 F.3d 518, 524 (9th Cir. 1995).
\textsuperscript{443} See id. at 487.
\textsuperscript{444} See LUE-HING ET AL., supra note 76, at 18.
\textsuperscript{446} See LUE-HING ET AL., supra note 76, at 16, 19.
\textsuperscript{447} Federal statutory liability allows for the recovery of natural resource damages, which may include damages not only for the cost of restoring the environment to its pre-contamination condition, but also damages for the recovery of compensable “values.” These values are the amount of money required to compensate the public for the loss of services provided by the injured resources between the time of the release and the time those resources are fully returned to their original state. See Natural Resource Damage Assessments, 59 Fed. Reg. 14,262, 14,286 (1994).
beneficial reuse projects performed in conformance with applicable regulations may result in contamination, thus subjecting them to federal statutory liability under CERCLA and RCRA.

V. Risk-Sharing Mechanisms

In examining the legal problems associated with sewage sludge application, one fact has become clear: "liability ... is an orphan—no one wants it, nor could any private business or individual accept it and stay in business."\(^{448}\) It is therefore not surprising that Farm Credit Institutions, consisting of major farm lenders in the United States, have also raised concerns over the potential damage to farmer livelihood should properties be subjected to the potential liabilities discussed above.\(^{449}\) Naturally, lenders do not wish to be subject to joint and several liability, and wish to preserve land productivity and value. Under CERCLA, ownership alone triggers liability, even though the owner has not actually participated in generating or disposing of the substance.\(^{450}\) Lenders have been found liable for clean ups even if they did not acquire the property, but had the capacity to affect hazardous waste disposal decisions.\(^{451}\) EPA has proposed a system of de minimus landowner settlements under CERCLA, and has exempted lenders from the definition of "owner-operator" if the lender does not participate in management and holds an "indicia of ownership primarily to protect [his] security interest ... ."\(^{452}\) If, however, a lender becomes an owner by foreclosing and taking title to the property, or by conducting management activities at the site, he is potentially liable.\(^{453}\)

Lenders are also wary of the other possible legal actions, discussed above, that may be brought against them or other parties involved. Thus, in order to explore the issues relating to liability arising from land application of sewage sludge, the Farm Credit Bank of Spring-


\(^{449}\) See generally id.

\(^{450}\) See Tanglewood E. Homeowners v. Charles Thomas, Inc., 849 F.2d 1568, 1572 (5th Cir. 1988).

\(^{451}\) See United States v. Fleet Factors Corp., 901 F.2d 1550, 1556 (11th Cir. 1990).

\(^{452}\) 42 U.S.C. § 9601(20)(E)(i).

\(^{453}\) The lender is eligible for a de minimus settlement if he meets the requirements of CERCLA section 122, including demonstrating that he conducted all appropriate inquiry prior to acquisition of the property. See id. § 9622(g).
field, Massachusetts, invited a number of interested parties to a two-

day symposium, in November of 1993, on “Minimizing Risks and

Sharing Liability from Application of Sludge and Sludge By-Products

on Agricultural Land.” The purpose of the symposium was to recom-

mend actions for minimizing any perceived or real risks attached to

land application, and to focus on the task of developing equitable

risk-sharing mechanisms within the joint and several liability frame-

work. 454 One conclusion was certain—under current law, landowners,

farm operators, and lenders are all potentially liable for risks arising

from application of sewage sludge, unless one of them assumes such

risks from the others through a clear, legally enforceable mechanism.

A variety of management tools and risk-sharing mechanisms were

explored at the Symposium. The following is a description of three of

these—bonds, insurance, and express indemnification agreements.

A. Bonds

The posting of bonds could adequately cover certain clearly defined

expenses, such as those associated with monitoring and management

costs. 455 However, bonds are less useful as a risk-sharing mechanism

in instances where potential liability exposure is large. For instance,

in cases where settlements would be costly or exposure to class action

suits would be broad, the bond required would be prohibitively ex-

pensive. 456 However, it is recognized that bonds could be a mechanism

to assure an available pool of funds should landowners and operators

fail to carry out best management practices, or should they no longer

be willing to do so.

B. Insurance

For companies engaged in potentially risky activities, such as sew-

age sludge land application, insurance can be a necessary protection

against a variety of claims. Any or all of the following parties could

obtain insurance coverage: the POTW, the sewage sludge-derived

\[\text{\footnotesize{\textsuperscript{454}} At the same time, participants called for Congress and EPA to confirm that land applica-

tion, done in conformance with regulations, would not be subject to the CERCLA liability scheme. See Benbrook & Allbee, supra note 448, at 7.}

\[\text{\footnotesize{\textsuperscript{455}} POTWs would have to post a general bond in favor of anyone injured or damaged, the state

for clean up costs, and possibly even the federal government if CERCLA liability attaches. A

secondary bond may be posted by “sludgers” and may be required under contract in case

sludgers violate 503 standards.}

\[\text{\footnotesize{\textsuperscript{456}} See Benbrook & Allbee, supra note 448, at 10–11.} \]
product manufacturer, other transporters, the sewage sludge contractor responsible for applying the sludge to land (sludger), and the farmer-landowner. However, the environmental liability and associated risks faced by these actors will rarely, if ever, be fully covered by insurance.\textsuperscript{457} Some sewage sludge vendors have purchased policies offering limited protection,\textsuperscript{458} although it is unclear what risks are actually covered, what standards a court would apply in determining responsibility among parties, or what limits of protection these policies afford. The effectiveness of insurance as a risk-sharing mechanism, and the cost of obtaining coverage, will depend upon the scope of the coverage provided, limitations on the number and size of claims, and the conditions that must be met in order to justify a claim.\textsuperscript{459}

The liability insurance policy that offers the broadest protections against third party suits is the "comprehensive general liability policy" (CGL).\textsuperscript{460} These policies are based on standard forms developed by the insurance industry and provide for two types of claims: those for bodily injury and those for property damage. However, these policies also contain a standard pollution exclusion, which is the most significant issue affecting coverage for suits involving sewage sludge application.\textsuperscript{461} A standard exclusion typically defines "pollutants" as "any solid, liquid, gaseous or thermal irritant or contaminant, including smoke, vapor, soot, fumes, acids, alkalis, chemicals, and waste. Waste includes materials to be recycled, reconditioned or reclaimed."\textsuperscript{462} The question is whether sludge is to be treated as a pollutant. In two related cases, Colorado courts have denied insurance company motions for summary judgment, and held that a question of fact existed as to whether treated sewage sludge was to be considered

\textsuperscript{457} See id. at 8.

\textsuperscript{458} For example, N-Viro International Corporation has obtained product liability insurance for N-Viro licensees who meet trademark specifications and EQ standards. Total coverage is $5 million per occurrence, such as crop failure due to the application of N-Viro soil during the insured period. Bodily injury and property damage to a third party are also covered, and there is no environmental waiver in this policy. However, this type of full product liability insurance coverage is atypical. See N-VIRO INTERNATIONAL CORPORATION, PRODUCT LIABILITY INSURANCE INFORMATION SHEET (1998) (on file with authors).

\textsuperscript{459} See Benbrook & Allbee, supra note 448, at 8.

\textsuperscript{460} See DAVID L. ELKIND, WEF STOCK NO.-CP3705 POTENTIAL LIABILITY FOR BIOSOLIDS LAND APPLICATION, AND THE USE OF INSURANCE TO MINIMIZE SUCH LIABILITY 16–3 (1997) (Presentation Before the Water Environment Federation Joint Residuals and Biosolid Specialty Conference on August 3–6, 1997) (on file with the authors).

\textsuperscript{461} See id. at 16–5.

\textsuperscript{462} Id.
a pollutant under the standard exclusion language.\textsuperscript{463} Both cases involved sewage sludge that was disposed of at landfills prior to the promulgation of Part 503 regulations, but the courts’ analyses remain pertinent. In \textit{City of Englewood v. Commercial Union Assurance Co.}, the insurers argued that they had no duty to defend the city’s disposal of municipal sewage sludge at a nearby landfill, because the disposal fell squarely within the pollution exclusion language in the insurance contract.\textsuperscript{464} However, the appeals court concluded that there \textit{was} a legal basis on which insurers might be held liable to indemnify the cities because there is a “pending legal issue regarding the characterization of domestic sewage sludge.”\textsuperscript{465} Noting that courts have recognized a distinction between toxic industrial sludge and nontoxic domestic sewage sludge and stabilized sewage sludge,\textsuperscript{466} the appeals court cited a Colorado federal district court ruling in \textit{Metro Wastewater Reclamation District v. Continental Casualty Co.}, which rejected the proposition that sewage sludge, as a matter of law, was an irritant, contaminant, or pollutant.\textsuperscript{467} The Colorado state court in \textit{Englewood} concluded that there was a mixed question of law and fact as to whether domestic sewage sludge is an irritant, contaminant, or pollutant within the meaning of the pollution exclusion clause.\textsuperscript{468}

With the advent of Part 503, the ambiguity regarding whether sewage sludge is to be considered an irritant, contaminant, or pollutant for pollution exclusion purposes is even more likely to be fact specific. It is important to note, however, that typical pollution exclusion language precludes coverage for bodily injury and property claims, but may not preclude coverage for “personal injury” claims.\textsuperscript{469} For example, in \textit{Blackhawk-Central City Sanitation District v. American

\textsuperscript{464} See 940 P.2d at 954–55.
\textsuperscript{465} Id. at 955.
\textsuperscript{466} See Minerva Enters., Inc. v. Bituminous Cas. Corp., 851 S.W.2d 403, 406 (1993) (finding pollution exclusion ambiguous as to whether it applied to damage caused when a septic system backed up and flooded a mobile home because the definition of pollutant is intended to exclude industrial waste, not common household waste); Village of Cedarhurst v. Hanover Ins. Co., 611 N.Y.S.2d 417, 421 (N.Y. Sup. Ct. 1994) (finding natural municipal garbage not a pollutant; thus, exclusion did not apply to damage caused from overflow of sewage system).
\textsuperscript{467} See 834 F. Supp. at 1260.
\textsuperscript{468} See \textit{City of Englewood}, 940 P.2d at 955.
\textsuperscript{469} Bodily injury claims are what most people think of as “personal injury.” Some policies contain additional coverage which the industry calls “personal injury” coverage. Personal injury coverage includes intentional acts such as libel and slander, but of particular importance is that
Guarantee & Liability Insurance Co., the court held that the pollution exclusion clause precluded property damage coverage for a complaint alleging damage from a POTW's discharge of pollutants in excess of federally permitted levels, but the court also held that the claim potentially fell under the policy's personal injury coverage, obligating the insurer to defend.\textsuperscript{470} However, this coverage was limited in TerraMatrix, Inc. v. United States Fire Insurance Co., where the court held that personal injury coverage under the CGL policy is applicable only to entries or invasions committed by an owner, landlord or lessee, not by third persons.\textsuperscript{471}

The Springfield Farm Credit Bank Symposium participants agreed that there are still many unresolved questions relating to insurance coverage for land application of sewage sludge. The problems regarding what environmental and liability risks are to be covered by policies, what mechanisms trigger claims against policies, and what evidentiary burdens a claimant must meet, are yet to be resolved.\textsuperscript{472} In all likelihood, insurance companies will add to existing pollution exclusion language specific limitations or other provisions unique to sewage sludge management.\textsuperscript{473} When that occurs, liability will again be governed by common law and statutory principles.

C. Express Contractual Indemnification: The Preferred Risk-Sharing Mechanism

The most readily available risk-sharing mechanism in the field of solid waste management is the indemnification contract.\textsuperscript{474} Claims for indemnification may arise because two parties have contracted to have one of them bear the expense of any judgment arising from the undertaking. This is called express indemnification. At the Springfield Symposium, it was agreed that: (1) POTWs generating sewage sludge should indemnify processors and others down the disposal chain against the risk that sewage sludge does not conform to the applicable Part 503 standards; (2) processors and handlers should indemnify farmers/landowners against the same risk, as long as the sewage

\textsuperscript{470} See 856 F. Supp. 584, 585 (D. Colo. 1994).
\textsuperscript{471} See 939 P.2d 483, 489 (Colo. App. 1997).
\textsuperscript{472} See BENBROOK & ALBEE, supra note 448, at 8.
\textsuperscript{473} See id. at 9.
\textsuperscript{474} See id.
sludge is properly applied by the farmers; and lastly, that (3) farmers/landowners applying sewage sludge themselves should indemnify processors, handlers, and generators against harm suffered as a result of farmers' negligence or failure to follow Part 503 regulations.475

However, open-ended indemnification contracts can often be problematic because, as discussed above, the risks associated with sewage sludge application are often difficult to identify and subject to technical uncertainty.476 If generators are municipalities, large judgments against them will limit their ability to provide other essential services to residents. Furthermore, companies and farmers may be forced into bankruptcy if subject to large judgments. Thus, the Farm Credit Bank and EPA have sought to develop a workable model contract for indemnification, outlining the terms of liability.477 The purpose of such a venture is to develop model contract language that could be used across the nation. The model indemnification clause reads as follows478

Contractor agrees to indemnify, defend, and hold harmless [Landowner/Leaseholder] from and against any and all claims, suits, actions, demands, losses, costs, liabilities, and expenses (including remediation costs and reasonable attorney fees) to the extent such losses result from: (1) Contractor's or Generator/Preparer's violation of applicable laws or regulations in effect at the time of biosolid application; or (2) the negligence or willful misconduct of Contractor in the delivery and application of biosolids to the undersigned Landowner's/Leaseholder's property. In the event this indemnification is enforced against the Contractor for a violation of law by a Generator/Preparer, Landowner/Leaseholder agrees to assign and subrogate to Contractor its claim against Generator/Preparer. This indemnification shall survive termination of this Agreement until the expiration of any applicable statutes of limitations. Landowner/Leaseholder shall promptly notify Contractor in the event of a third-party claim and Contractor shall have the right to provide and oversee the defense of such claim and enter into any settlement of such a claim at its discretion (holding the landowner/leaseholder harmless). Landowner/Leaseholder agrees to fully cooperate with Contractor in the defense against any third-party claim.479

475 See id. at 9-10. Also note that although indemnification occurs most often in the form of contracts, it can be implied by the courts by examining the particular relationships among parties.

476 See id. at 10.


478 Realistic indemnification devices should also take into account that compliance with the existing law might still result in damage.

479 Forste, supra note 477, at 9.
The efficacy of such an agreement has yet to be tested in the courts. If societal concerns clearly seem to outweigh the interests in enforcement of such language, then the above agreement may be unenforceable under grounds of public policy. Although this is true, courts have determined after much debate that there is no public policy against private parties bargaining over indemnification for CERCLA liability. So it is likely that “freedom of contract” would not be limited for sewage sludge. However, the clause’s “any and all claims” language may be a source of future litigation. Does this language indicate an intent on the part of the Contractor to indemnify the owner/leaseholder against liability based on the owner/leaseholder’s concurrent negligence with the contractor? The sole negligence of the owner is clearly not covered. Most importantly, what about strict liability claims? The court may look beyond the contract to general law and custom in determining if the quoted language indicates an intention to indemnify against an indemnitee’s strict liability. This is clearly a gamble for indemnitees.

Overall, the above contractual language demonstrates a move in the sewage sludge management arena towards a contractually governed system—a system where single contractors will carry out all the regulatory steps “in house” in order to reduce liability and transaction costs. Naturally, these companies want assurances from farmers that management requirements are being followed. This is now the role of the indemnification contract. The control of the sewage sludge arena by large companies makes sense, because “in reality . . . indemnity agreements do not shift the loss, but shift the burden of paying for and procuring insurance.” However, only large contractors can afford liability coverage.

This new contractually-based system has changed the nature of sewage sludge management litigation. A new breed of lawsuits is evolving, which focus solely on contractual questions. For example, in City of Reading v. Wheelabrator Water Technology, Inc., a dispute arose relating to whether Wheelabrator was entitled to a “change order” requiring the City to compensate it for an unforeseen increase in the cost of performing the contract. A “change order” was defined

481 See 42 U.S.C. § 9607(e)(1); see also Mardan Corp. v. C.G.C. Music Ltd., 804 F.2d 1454, 1459 (9th Cir. 1986).
by the contract as a written order to the contractor, signed by the owner, authorizing an addition or deletion to or revision in the work, or an adjustment in the contract price, issued after the effective date of the contract.484 After the contract was executed, it became evident that none of the sewage sludge collected from the city’s wastewater treatment plant could be beneficially reused due to a problem with excess levels of molybdenum.485 Because all of the sewage sludge now had to be landfilled, the cost of performing the contract increased significantly. As a result, Wheelabrator requested a “change order” to the contract that would recognize these increased costs, but the city refused, arguing that it had sole discretion to either award or not award the order. Wheelabrator then requested arbitration pursuant to a provision within the contract. The arbitrator rejected the city’s argument that Wheelabrator had assumed the risk of variations in the amount of reuseable sewage sludge, and awarded the change order. The district court upheld the arbitrator’s decision.486 This case is a prime example of the types of legal issues likely to emerge in the sewage sludge field. It is conceivable that most future suits, whether or not they involve questions of liability, will involve the interpretation of contract provisions.

Another example of a contractual risk-sharing mechanism is the lease. Leases are often relied on in situations where “agricultural assessment” is employed in order to preserve farmland in rapidly developing areas. Under agricultural assessment statutes, owners of farmland pay property taxes based on the agricultural value of the land, as long as it remains in agriculture.487 If the owner wants to develop the farmland, he must pay a “rollback penalty” composed of the difference between property taxes based on agricultural and development value over a certain number of prior years.488

In states like New Jersey, which have adopted agricultural assessment strategies, farmland is typically sold by farmers to developers, who lease the land back to the farmer-seller until market pressure dictates development of the farmland. Until this occurs, the devel-

484 Id. at *2.
485 See id. at *3.
486 See id. at *6.
487 Where there is heavy development pressure on farmland, the agricultural value of the land may be as little as ten percent of the development value. See N.J. ADMIN. CODE tit. 2 § 76–10 (1999).
488 In New Jersey, the rollback penalty period is three years. See N.J. STAT. tit. 54:4–23.8 (1998).
oper-lessee will hold the property while paying comparatively low property taxes and collecting rent from the farmer-lessee. Since the sale-leaseback transaction is a prelude to the ultimate development of farmland, such a lease typically contains a prohibition on the application of sewage sludge to the property under lease.

Even the New Jersey Department of Environmental Protection forbids sewage sludge application on lands subject to state-purchased conservation easements. In contrast, other divisions in the same Department favor sewage sludge application and regulate it as a fertilizer. These inconsistent sewage sludge management policies within a particular state agency are another example of conflicting and counterproductive attitudes towards land application of sewage sludge.

CONCLUSIONS AND RECOMMENDATION

Some liability issues will remain intractable, even if Congress amends CERCLA and RCRA to preclude all possibility of governmental and private actions to remediate sites and collect natural resource damages where sewage sludge has been land applied. Significant exposure to liability will probably continue under state cleanup statutes and common law causes of action.

This is an area of public policy pervaded by scientific uncertainty, and where there exists a substantial disjunction between governmental goals and public outrage. Among the scientific community, there is a principled and meaningful disagreement about whether current governmental regulation of land application will be effective in protecting public health and welfare. Federal and state governments are primarily concerned about disposal of the increasing amounts of sewage sludge, produced by POTWs, without ocean disposal or incineration. Members of the public, on the other hand, are more concerned about the quality of their individual drinking water supplies and their property values than about sewage sludge disposal in general. Moreover, the large agribusiness operations that are increasingly dominat-

489 The Deed of Easement for Farmland Preservation in New Jersey prohibits “waste” (which is currently defined as including sewage sludge) from being applied to the property. See N.J. Admin. Code tit. 2 § 76-3.12(a)7 (1999).
490 See Telephone Interview with Sherry Dudas, Right to Farm Program Specialist, State Agricultural Development Commission (July 15, 1998) (notes on file with the authors).
491 Sewage sludge production has doubled since the enactment of the Clean Water Act in 1972. See Leather Indus. of America v. EPA, 40 F.3d 392, 394 (D.C. Cir. 1994).
ing the agricultural sector do not evoke as much public sympathy as did the family farm, making successful lawsuits by neighbors more likely than in the past. In light of the scientific uncertainties and the disjunction between public goals, it is unlikely that states will be able to muster the political support necessary to amend their Right to Farm Acts so as to immunize abnormally dangerous activities (including sewage sludge application) from common law suits by farmers or neighbors. The ambiguities regarding liability for land application will only exacerbate the siting disputes that are beginning to fester around the country.

In order to expedite the beneficial reuse of sewage sludge through application on farmland, Congress should establish a liability indemnification fund that would indemnify actors in the sewage sludge management process who have complied with applicable federal and state law, for the costs of compensating farmers and neighbors who have suffered personal injury and property damage that can reasonably be attributed to the land application of sewage sludge. Such a governmental indemnity fund is necessary because the private insurance market will continue to exclude sewage sludge application from liability coverage.

The sewage sludge land application liability fund legislation would establish an administrative entity that is authorized to resolve disputes (subject to judicial review) pursuant to strict limitations on liability (e.g., by excluding punitive damage claims). This board would also be empowered to utilize flexible approaches to identify causation of damage, such as the substantial factor test that has become the law in some states. In addition, the board would be authorized to award funding for medical surveillance in cases where substantial exposure has occurred but palpable symptoms have not yet appeared. Adhering to the “Polluter Pays Principle,” the fund should be at least partially financed by a tax on indirect discharges into POTWs. The tax would be based on the toxicity and volume of discharged materials. Taxing indirect dischargers will counterbalance the indirect dis-

492 This model is loosely based on the fund established by the Price-Anderson Act to deal with liability concerns arising from the siting of nuclear power plants. See Price-Anderson Act, 42 U.S.C. §§ 2011–2296 (1994).
493 See Plater et al., supra note 157, at 255–71.
494 See, e.g., Ayres v. Jackson Township, 525 A.2d 287, 298 (N.J. 1987) (residents who alleged that wells from which they received their drinking water were polluted by toxic waste leaking from a municipal landfill recovered damages for enhanced risk of future illness and medical surveillance).
charge subsidy. It will also stimulate pollution prevention because the alternatives to indirect discharge—hazardous waste disposal under RCRA and direct discharge into waterbodies under the CWA—are considerably more expensive and closely regulated than indirect discharge into POTWs.

A less desirable alternative to this indemnification mechanism would be federally subsidized insurance (similar to Federal Flood Insurance) or bond premiums for sewage sludge application.495 This approach, however, would militate against compensation because private insurance or bonding companies would be the primary decision-makers regarding claims for compensation. In light of the extensive scientific uncertainty regarding the public health effects of sewage sludge, this mechanism would be unfair to claimants. However, it could be administered by existing market actors and government agencies, without necessarily including a tax on indirect dischargers.

Whatever compensation device is chosen, Congress must resolve the policy dichotomy between sewage treatment residuals perceived as potentially dangerous sewage sludge or benign, beneficial biosolids if the environmental loop regarding these residuals is to be satisfactorily closed.

Table 1 Different types of sewage sludge and their characteristics.\(^1\)

<table>
<thead>
<tr>
<th>Type of sewage sludge</th>
<th>Stabilization and Disinfection Methods</th>
<th>Pathogen Reduction Standard Met</th>
<th>Properties</th>
<th>Common Use in Land Application</th>
<th>Use as stabilization method for landfills and incineration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid/ dewatered</td>
<td>Anaerobic digestion,(^2) anaerobic digestion,(^3) or lime</td>
<td>In most cases Class B</td>
<td>liquid (1-5% solids content), dewatered (12-30% solids content)</td>
<td>Nutrient source</td>
<td>Yes</td>
</tr>
<tr>
<td>Advanced Alkaline Stabilized</td>
<td>Addition of lime material such as quick lime, hydrated lime, or cement kiln dust</td>
<td>Class A</td>
<td>Relatively dry; significant liming value</td>
<td>Mostly as liming material</td>
<td>Yes, as landfill cover only</td>
</tr>
<tr>
<td>Composted</td>
<td>Composting</td>
<td>In most cases Class A</td>
<td>Relatively stable; humus-like</td>
<td>Soil amendment</td>
<td>Yes, as landfill cover only</td>
</tr>
<tr>
<td>Pelletized</td>
<td>Drying sludge at high temperatures</td>
<td>Class A</td>
<td>Dry, flows well</td>
<td>Specialty fertilizer mixes, sidedress fertilizer</td>
<td>Yes</td>
</tr>
</tbody>
</table>

2. Aerobic digestion - the degradation of concentrated wastewater solids, during which aerobic bacteria (bacteria which need the presence of oxygen) break down the organic matter into mostly inert solids, carbon dioxide and water. See id.
3. Anaerobic digestion - the degradation of concentrated wastewater solids, during which anaerobic bacteria (bacteria which can not live in the presence of oxygen) break down the organic matter into mostly inert solids, carbon dioxide and methane. See id.
Table 2 Maximum cumulative pollutant loading for trace elements according to 1989 Proposed 503 Sewage Sludge Standards (agricultural land and use in home gardens).\(^1\)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Cumulative Pollutant Loading (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>14</td>
</tr>
<tr>
<td>Cadmium</td>
<td>18</td>
</tr>
<tr>
<td>Chromium</td>
<td>530</td>
</tr>
<tr>
<td>Copper</td>
<td>46</td>
</tr>
<tr>
<td>Lead</td>
<td>125</td>
</tr>
<tr>
<td>Mercury</td>
<td>15</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>5</td>
</tr>
<tr>
<td>Nickel</td>
<td>78</td>
</tr>
<tr>
<td>Selenium</td>
<td>32</td>
</tr>
<tr>
<td>Zinc</td>
<td>170</td>
</tr>
</tbody>
</table>

Table 3 Pollutant limits according to 40 CFR Part 503

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Ceiling Concentration (mg/kg dry sludge)</th>
<th>Pollutant Concentration (mg/kg dry sludge)</th>
<th>Cumulative Pollutant Loading (kg/ha)</th>
<th>Annual Pollutant Loading Rate (kg/(ha * yr))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>75</td>
<td>41</td>
<td>41</td>
<td>2.0</td>
</tr>
<tr>
<td>Cadmium</td>
<td>85</td>
<td>39</td>
<td>39</td>
<td>1.9</td>
</tr>
<tr>
<td>Chromium2</td>
<td>3,000</td>
<td>1,200</td>
<td>3,000</td>
<td>150</td>
</tr>
<tr>
<td>Copper</td>
<td>4,300</td>
<td>1,500</td>
<td>1,500</td>
<td>75</td>
</tr>
<tr>
<td>Lead</td>
<td>840</td>
<td>300</td>
<td>300</td>
<td>15</td>
</tr>
<tr>
<td>Mercury</td>
<td>57</td>
<td>17</td>
<td>17</td>
<td>0.85</td>
</tr>
<tr>
<td>Molybdenum3</td>
<td>75</td>
<td>18</td>
<td>18</td>
<td>0.90</td>
</tr>
<tr>
<td>Nickel</td>
<td>420</td>
<td>420</td>
<td>420</td>
<td>21</td>
</tr>
<tr>
<td>Selenium4</td>
<td>100</td>
<td>36</td>
<td>100</td>
<td>5.0</td>
</tr>
<tr>
<td>Zinc</td>
<td>7,500</td>
<td>2,800</td>
<td>2,800</td>
<td>140</td>
</tr>
</tbody>
</table>

2. In Leather Industries of America v. EPA, 40 F.3d 392, 394 (D.C. Cir. 1994), POTWs and privately-owned treatment works filed a petition with the U.S. Circuit Court of Appeals to review the pollutant limits for chromium. EPA concluded that there are no data justifying the chromium regulation and subsequently removed all limits from the regulations. See 60 Fed. Reg. 54,764, 54,764-65 (1995).
3. Climax Metals Company and several other companies filed a petition for EPA to reconsider the molybdenum limits. EPA concluded its limits were more restrictive than necessary and deleted the pollutant concentration, the cumulative loading, and the annual loading rate for molybdenum. However, new numerical limits will be promulgated in the future. See Standard for Use or Disposal of Sewage Sludge, 59 Fed. Reg. 9095, 9096 (1995).
4. The City of Pueblo, Colorado, filed a petition with the U.S. Circuit Court of Appeals for the Tenth Circuit (transferred to the Circuit Court of Appeals for the District of Columbia) to review the pollutant limits for selenium. See Leather Indus., 40 F.3d at 394; 60 Fed. Reg. at 54,764. The pollutant concentration for selenium is the 99th percentile value from the National Sewage Sludge Survey. See 60 Fed. Reg. at 54,764. Since the court required that the pollution concentration be risk-based, in 1995 EPA replaced the pollution concentration of 36 mg/kg with the risk-based limit of 100 mg/kg. See id. at 54,765.