Tulsa Law Review

Volume 19 | Number 2

Winter 1983

Hazardous Waste Injection Wells: The Need for State Controls

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HAZARDOUS WASTE INJECTION WELLS: THE NEED FOR STATE CONTROLS

I. INTRODUCTION

With the emergence of a federal administration which places low priority on environmental concerns,[1] states are beginning to realize that they must take steps to protect their own environmental resources[2] and to compensate for deficiencies in federal regulation which has allowed unwarranted pollution to continue.[3] The federal government, through

1. *See Reauthorization of the Resource Conservation and Recovery Act: Hearings Before the Subcomm. on Environmental Pollution of the Senate Comm. on Environment and Public Works*, 97th Cong., 2d Sess. 25 (1982) (statement of Sen. Gary Hart) [hereinafter cited as *Reauthorization Hearings*]. Sen. Hart stated:

> The EPA [Environmental Protection Agency] over the past 15 months has put a premium on deregulation and budget cuts in key areas of hazardous waste management. Promulgation of standards governing landfilling, boilers, and small generators has been delayed and, in some cases, indefinitely postponed. Crucial reporting requirements have been deferred . . . . The RCRA [Resource Conservation and Recovery Act] enforcement program under this administration has been plagued by confusion, delay, and inaction . . . [which] not only fails to force compliance, but encourages defiance and continued violation of the law.

Id.

This apparent lack of concern also has been reflected in administrative budget proposals. Former EPA Administrator Anne Burford requested a 1983 operating budget of $975 million, which would have been 30% less than the 1981 budget. This proposal included a 50% cut in EPA research and development and a 38% cut in control, abatement, and compliance activities. Also proposed was a 2000-employee reduction, in addition to President Reagan's proposed additional 12% cut in personnel. *Preliminary Proposal for Fiscal 1983 Includes Major EPA Budget, Personnel Cuts*, [12 File Binder] ENV'T REP. (BNA) 675 (Oct. 2, 1981) [hereinafter cited as *Preliminary Proposal*].

The Reagan administration's "low priority" approach to the environment is evidenced by the deep cuts in environmental programs. Examples include cuts, totaling $1.1 billion, in Department of Interior programs such as the Office of Water Research and Technology, the Land and Water Conservation Fund, and grants for the protection and study of endangered species. EPA regulatory programs also received cuts, including $50 million cut from water quality, $4 million cut from drinking water, $24 million cut from hazardous waste and $10 million cut from toxic waste regulations. *Reagan Budget Slashes Environmental Programs*, NAT'L WILDLIFE, Feb.-Mar. 1982, at 24B.

These cuts came at a time when the EPA workload had doubled. *Preliminary Proposal*, *supra*, at 675.

Such fiscal attacks not only affect current EPA effectiveness but, as former EPA Administrator Douglas M. Costle pointed out, the loss of experienced personnel to budget cuts could take as long as ten years to repair. *Id.* at 676.

2. *See Reauthorization Hearings*, *supra* note 1, at 38; *see also* Comment, *Groundwater Pollution in South Dakota: A Survey of Federal and State Law*, 23 S.D.L. REV. 698, 721 (1978) ("Though many federal statutes affect groundwater protection, the great burden of protecting underground water supplies lies almost completely with the states at the present time.").

3. *See* Comment, *supra* note 2, at 733.

the creation of the Environmental Protection Agency[4] (EPA), has attempted to control environmental pollution[5] but has fallen short in many areas.[6] The pollution of groundwater[7] by the injection of hazardous waste into wells is one such area.[8]

This Comment will demonstrate that federal legislation, particularly the Federal Water Pollution Control Act[9] (FWPCA), the Safe Drinking Water Act[10] (SDWA) and the Resource Conservation and Recovery Act[11] (RCRA), has failed to adequately address the problem of groundwater pollution by the injection of hazardous waste into wells. Further, it is argued that states must be willing to assume the responsibility for environmental regulation, and that only through

4. Reorg. Plan No. 3 of 1970, *reprinted in* 5 U.S.C. app. at 1132 (1982), *and in* 1970 U.S. CODE CONG. & AD. NEWS 6322.

5. Federal regulations which have failed to meet pollution problems are discussed more fully *infra* notes 52-119 and accompanying text.

6. *See* Comment, *supra* note 2, at 710-21; *see also* Rea, *Hazardous Waste Pollution: The Need for a Different Statutory Approach*, 12 ENVTL. L. 443 (1982). Rea believes that only a new federal approach can solve problems of toxic waste dumping. To protect groundwater resources, Rea believes, the approach should include regional waste treatment and disposal facilities, a compensation fund for personal medical injuries, and the creation of a federal toxic tort based upon strict liability. *Id.* at 466-67. Although Rea's suggestions may be ones that should be seriously considered, the present mood of the EPA as reflected in its lackadaisical enforcement of regulations, as well as administrative budget cuts, *see supra* note 1, may force states to realize that they, and not the federal government, will need to take action.

7. *See Interim Report on Groundwater Contamination: EPA Oversight*, H.R. REP. NO. 1440, 96th Cong., 2d Sess. 10-11 (1980), where the House Committee on Government Operations concluded:

> (1) This nation is highly dependent on ground water.
>
> (2) Ground water destruction will be one of the most serious environmental problems of the 1980's.
>
> (3) The health of millions of Americans is threatened by government and industry's past failure to properly protect our ground water.
>
> 4) The destruction of our nation's ground water will continue unless we move immediately to locate all potential sources of ground water contamination and take action to block the further flow of toxic substances into the ground.
>
> 5) We can expect hundreds of more cases of ground water contamination to be discovered as a result of our past failure to protect our ground water. Some cases will have been caused by disposal of toxic substances that took place decades ago.
>
> 6) In many areas, cases of contamination may have resulted in irreversible damage to ground water resources or rendered them unusable for decades or perhaps even geologic time.

The committee also stated, "To date the Federal effort has been haphazard and ineffective, despite numerous Federal statutes already on the books allowing EPA to take additional action to protect this vital resource." *Id.* at 3.

8. Mack, *Ground Water Management in Development of a National Policy on Water* 140, Nat'l Water Comm'n Rep. EES-71-004 (Jan. 31, 1971). The injection well process is described *infra* notes 23-30 and accompanying text.

9. 33 U.S.C. §§ 1251-1376 (1982).

10. 42 U.S.C. §§ 300f to 300j-10 (1982).

11. *Id.* §§ 6901-6987.

more stringent state regulation, and better state-federal and state-state cooperation, will this problem be solved.

II. INJECTION WELL CONTAMINATION OF GROUNDWATER

Groundwater is a vast and extremely important natural resource. The United States Geological Survey has estimated that in the forty-eight contiguous states the groundwater supply at depths of one-half mile is 180 billion acre-feet.[12] Forty-six billion acre-feet of this groundwater are usable with current technology.[13]

Many states are highly dependent on groundwater for their water supplies.[14] It is estimated that eighty percent of all water used by U.S. cities comes from groundwater,[15] which means that about thirty percent of the U.S. population is dependent upon groundwater for supplying its communities.[16] In addition to urban dependency, almost all rural water is taken from groundwater resources.[17] In the past thirty years, the demand for groundwater has grown at an alarming rate. From 1950 to 1980, the volume of groundwater withdrawn per day in the United States increased from thirty to thirty-five billion gallons to eighty to one hundred billion gallons.[18] Yet the sources of good quality groundwater are being threatened.[19] One of the greatest dangers to

12. COMPTROLLER GENERAL OF THE UNITED STATES, GEN. ACCT. OFF. REP. TO CONGRESS, GROUND WATER: AN OVERVIEW 1 (1977) [hereinafter cited as *Comptroller*].

13. The 46 billion acre-feet is estimated to be equivalent to the annual precipitation of the United States over approximately ten years. *Id.* For a brief summary of the ten U.S. groundwater regions, see D. TODD, GROUND WATER HYDROLOGY 57-60 (2d ed. 1980).

14. Kansas is the most dependent on groundwater for its total water use, getting 87% of its water supply from groundwater. D. TODD, *supra* note 13, at 10-14. Arizona receives 61% of its total water supply from groundwater. *Comptroller*, *supra* note 12, at 1. California depends on groundwater for 40% of its total water supply, as does North Dakota. *Id.* at 2-3. Seventy-three per cent of North Dakota's domestic water use comes from groundwater. *Id.* at 3. Texas uses groundwater for nearly 75% of irrigation, municipal and industrial purposes. In some parts of the state groundwater is virtually the sole source of water. *Id.* at 2. Texas and California use a greater volume of groundwater than all other states. In 1970, the combined groundwater use of the two states was approximately 30.8 million acre-feet. *Id.* at 2-3.

15. *Comptroller*, *supra* note 12, at 1.

16. *Id.*

17. *Id.*

18. *Id.* at 2.

19. Four major threats to groundwater resources are overdrafting, salt water intrusion (the migration of salt water into fresh-water aquifers due to man-made changes in hydrologic pressure), land subsidence, and pollution. *Id.* at 5. This Comment deals primarily with contamination by pollution, but all four problems are related. For example, overdrafting of an aquifer may so change the pressure of a hydrological area that it triggers salt water intrusion, a kind of pollutant in itself, or permits hazardous waste disposed at a lower strata which is under higher pressure to migrate up and into the fresh-water aquifer. *Id.* at 16.

these resources is contamination by hazardous waste.[20] While contamination may originate at a surface source, such as an unlined, industrial waste lagoon,[21] a primary subsurface source of groundwater pollution is the use of injection wells to dispose of hazardous waste.[22]

Injection wells are devices used by industry,[23] households and municipalities to force liquids or gases into the ground for a variety of purposes, many of which are useful or benign.[24] A questionable use of

20. An example of the extent of groundwater pollution is illustrated by the findings contained in a briefing, prepared by the Criteria and Standards Division Science and Technology Branch Exposure Assessment Project and submitted to the House Hearing on Toxic Chemical Contamination of Groundwater. The briefing reported on the presence of trichloroethylene (TCE) and other chemicals in groundwater of 19 states. TCE, an organic chemical compound used as a solvent, was found in 36% of the groundwater which was sampled. At high doses, TCE can damage the liver and kidneys and harm the central nervous system. Long-term exposure to TCE has been found to be carcinogenic in laboratory animals. *Toxic Chemical Contamination of Groundwater: EPA Oversight: Hearings Before a Subcomm. of the House Comm. on Government Operations*, 96th Cong., 2d Sess. 260, 339 (1980) [hereinafter cited as *Contamination Hearings*]. Towns such as Warrington, Pa., and Acton, Mass., have been forced to close down their wells due to TCE contamination. *Id.* at 21, 213-15. This problem is further addressed *infra* notes 36-40 and accompanying text.

21. Unlined lagoons used for the impoundment of industrial waste are a major surface source of groundwater contamination. Contaminants in the lagoons leach into the ground and eventually into the groundwater, polluting the underground source. *Contamination Hearings, supra* note 20, at 104-05.

22. *See id.* at 145; Comment, *supra* note 2, at 698 n.4.

23. Industrial use of injection wells may include disposal of hazardous waste, return of water pumped from wells used in cooling processes, the pumping of hot brine into rock formations containing oil shale or tar sands, or even pumping of cottonseed hulls into fresh water zones to "restore pressure in the drilling of a gas well." ENVIRONMENTAL PROTECTION AGENCY, PROCEEDINGS OF THE FOURTH NATIONAL GROUND WATER QUALITY SYMPOSIUM 45 (1979) [hereinafter cited as *Symposium Proceedings*].

24. Some uses of injection include air-conditioning return flow wells, cesspools, cooling-water return flow wells, drainage wells, aquifer recharge wells, salt water intrusion barrier wells, septic system wells, wells used to recover geothermal energy, and wells used for *in situ* recovery of lignite coal, tar sands and oil shale. 40 C.F.R. § 146.5(e) (1982). Air-conditioning return flow wells use the cooling effect of subsurface temperature to cool liquids. The liquids are brought to the surface, where the heat of the subject building is transferred to the fluid. The liquids then are returned to the ground and cooled again. *See* D. TODD, *supra* note 13, at 488. This type of injection well may pose little threat unless the system leaks and allows the liquid to leach into groundwater. This problem could be prevented by the use of non-polluting cooling fluids.

Cesspools are proving to be less benign than once thought. *Id.* at 335. Cesspools are underground holding tanks used in lieu of a sewer. Waste drains into the tank and eventually leaches into the surrounding soil. *Id.* at 335-36. A problem arises when either household or industrial chemical waste is routinely disposed of in a cesspool. Many of these chemicals do not decompose as does other waste, but instead remain toxic. Once they leach into the soil, they may contaminate nearby groundwater that is being used as a drinking water source. Instances of such pollution are becoming increasingly frequent and may have disastrous results. *See Contamination Hearings, supra* note 20, at 223-24.

Aquifer recharge wells illustrate positive use of injection well technology. Fresh water is pumped into aquifers to accelerate the recharge of the aquifer. *See* D. TODD, *supra* note 13, at 467. This method is especially important in arid regions of the country threatened by depletion of essential aquifers due to slow recharge rates, or in areas such as California, where depletion has resulted from overdrafting. *Comptroller, supra* note 12, at 14. Fresh water can be injected into

injection wells is the injection of hazardous waste into the ground. Conceptually, the injection well process should provide a safe method of confining hazardous waste in subsurface formations, thereby precluding its escape.[25] Problems develop, however, when injected waste travels into underground water reservoirs,[26] or when the waste is pumped directly into groundwater aquifers which are considered unusable because of high mineral content in the water.[27] Either method may be imprudent, given the already high dependency on groundwater in parts of the United States[28] and the probable future increases in the use of groundwater. The expense of cleaning up an underground pollution disaster would be tremendous.[29] Moreover, the intentional pollution of "useless" mineralized groundwater seems fallacious, especially as water needs increase and the development of new technology makes demineralization economical.[30]

Other types of injection wells which seriously threaten ground-

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aquifers during seasons of increased precipitation and recovered when needed. The method is superior to surface reservoirs, because less water is lost to evaporation; further, fresh-water injection is the only way to immediately recharge confined aquifers. *See* D. CEDERSTROM, E. BOSWELL & G. TARVER, SUMMARY APPRAISALS OF THE NATION'S GROUNDWATER RESOURCES—SOUTH ATLANTIC-GULF REGION, 027-029 (1979). Fresh-water injection also is used in salt water intrusion barrier wells with positive results. This method is used both in coastal regions, where depletion of groundwater allows oceanic salt water to migrate into fresh-water areas, and in inland areas, where saline water migrates upward due to changes caused by pumping of fresh water. *See Comptroller*, *supra* note 12, at 16-18. For an extensive treatment of the variety of recharge methods in saline intrusion situations, see D. TODD, *supra* note 13, at 458-520.

Finally, injection wells also are used beneficially to recover geothermal energy. In this process, liquid is pumped through pipe into a geothermal formation such as a hot spring or geyser. The liquid is heated into steam, which returns to the surface and is used to generate electricity. This type of technology has made geothermally rich countries, such as Iceland, virtually energy independent. *Id.* at 54. All of these types of wells come under EPA Class V injection well classification, *see infra* notes 85-90 and accompanying text, and are governed by fairly minimum regulation. *See* 40 C.F.R. §§ 146.51-.52 (1982).

25. Walker and Cox contend that "[t]he validity of this concept depends on two basic factors: (1) the presence of suitable receptor zones, and (2) the existence of adequate confinement." W.R. WALKER & W.E. COX, DEEP WELL INJECTION OF INDUSTRIAL WASTES 2 (1976). They also point out that the injection well method should more properly be considered a type of waste storage, rather than waste disposal, because of the lack of positive evidence that waste will neutralize when it is underground, and because the potential for pollution of groundwater resources is a long-term threat. *Id.* at 3. The use of injection may not only be a threat to groundwater, but also may contaminate other underground natural resources, deplete valuable underground storage potential, and possibly increase seismic activity through changes in the subsurface pressure. *Id.* at 7-11.

26. *Id.* at 8.

27. For a further discussion of what is considered unusable, see *infra* notes 79-83 and accompanying text.

28. *See* Comment, *supra* note 2, at 699-705.

29. It has been estimated that cleaning up all polluted groundwater sites in the United States may cost up to $12.5 million per site, with a total bill of $44 billion. Rea, *supra* note 6, at 444-45; *see also* Fisher, *The Toxic Waste Dump Problem and a Suggested Insurance Program*, 8 B.C. ENVTL. AFF. L. REV. 421 (1980).

30. *See* W.R. WALKER and W.E. COX, *supra* note 25, at 8; *NRDC, States Criticize Proposed*

water are septic tanks and cesspools.[31] Septic tanks are sewage disposal devices in which sewage and waste are pumped underground into tanks which separate solid from liquid waste.[32] The liquid then is discharged into a biologically active zone, which treats the liquid and removes most bacteria and viruses.[33] Cesspool systems retain sewage in a porous underground chamber; liquid is allowed to leach into the soil, and is treated in a biologically active zone.[34]

These two sewage systems may become conduits for hazardous waste contamination of groundwater when household products, such as solvents or pesticides, are routinely disposed of. Harmful chemicals in such products enter the soil and migrate into nearby groundwater.[35] These widely accepted disposal methods have been at least partially blamed for contaminating groundwater (including city wells) in and around Warrington, Pennsylvania.[36] In 1979, test results confirmed that two of the city's wells were contaminated with trichloroethylene (TCE)[37] at levels of forty-five parts per billion (ppb) and twenty-six ppb, respectively.[38] The Pennsylvania limit for TCE in drinking water is only 4.5 ppb.[39] These results forced the closing of the town wells, requiring the community to import water from neighboring areas. Due to media attention, many residents living outside the Warrington city limits had their private rural wells tested. Some rural wells had concentrations of TCE as high as 4200 ppb.[40] Partial blame for the contamination was placed on disposal of consumer products containing TCE into septic sewer systems.[41]

Although groundwater pollution caused by various uses of injection wells poses a serious widespread problem, governmental attempts to solve the problem have been largely ineffective.

Revision To Underground Injection Control Program, [12 File Binder] ENV'T REP. (BNA) 1146 (Jan. 15, 1982).

31. Individually, septic tanks and cesspools are relatively small in size, but their widespread use makes them a major threat to groundwater quality. This method of waste disposal is used by about 40 million people in the United States; about 2.5 billion gallons of sewage are discharged into the ground daily. D. TODD, *supra* note 13, at 335.

32. *Id.*

33. *Id.* at 336.

34. *Id.* at 335-36.

35. *See Contamination Hearings*, *supra* note 20, at 224.

36. *Id.*

37. *Id.*

38. *Id.*

39. *Id.*

40. *Id.* at 223.

41. *Id.*

III. DEFICIENCIES IN FEDERAL REGULATORY STRUCTURE

The federal government has attempted to control disposal of solid waste since 1965.[42] Its attempt to control nationwide pollution of surface water resources dates back even further, to the Federal Water Pollution Control Act of 1948.[43] In 1970, the Environmental Protection Agency (EPA) was created[44] to rationally and systematically organize the government's influence in environmental activities.[45] Despite attempts to protect water resources and minimize the effects of waste disposal, the danger of destroying water resources by various methods of hazardous waste disposal still exist.[46] Plainly, federal programs have failed to stop groundwater pollution, particularly the pollution caused by injection wells.[47] The Federal Water Pollution Control Act (FWPCA),[48] the Safe Drinking Water Act (SDWA),[49] and the Resource Conservation and Recovery Act (RCRA)[50] recently have been enacted to protect water resources.[51] Nevertheless, due to loopholes, budget cuts and lax enforcement by the EPA, these acts also have failed

42. *See* Solid Waste Disposal Act of 1965, Pub. L. No. 89-272, 79 Stat. 997 (codified as amended at 42 U.S.C. §§ 3251-3259) (current version at 42 U.S.C. §§ 6901-6987 (1982)). Under the SWDA, solid waste was narrowly defined to include only "garbage, refuse, and other discarded solid materials, including solid-waste materials resulting from industrial, commercial, and agricultural operations, and from community activities." 42 U.S.C. § 3252(4) (1970). The Act specifically excluded "solids or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or other common water pollutants." *Id.* Under the RCRA, the definition of solid waste has been expanded to include hazardous waste. *See* 42 U.S.C. §§ 6903(5), (27) (1982).

43. Pub. L. No. 80-845, 62 Stat. 1155 (codified as amended at 33 U.S.C. §§ 1151-1165) (current version at 33 U.S.C. §§ 1251-1376 (1982)).

44. *See* Reorg. Plan No. 3 of 1970, *reprinted in* 5 U.S.C. app. at 1132 (1982), *and in* 1970 U.S. CODE CONG. AND AD. NEWS 6322.

45. *Id.*

46. *See supra* notes 1-11, 19-41 and accompanying text.

47. It has been estimated that there are 500,000 injection wells in the United States. Four hundred wells are used to inject waste in deep wells (below the strata containing drinking water sources); 140,000 dispose of waste generated by oil and gas production; and 5000 to 10,000 wells inject hazardous waste into or above strata containing drinking water. ENVIRONMENTAL PROTECTION AGENCY, PLANNING WORKSHOPS TO DEVELOP RECOMMENDATIONS FOR A GROUNDWATER PROTECTION STRATEGY, app. V-12 (1980).

48. 33 U.S.C. §§ 1251-1376 (1982).

49. 42 U.S.C. §§ 300f to 300j-10 (1982).

50. *Id.* §§ 6901-6987.

51. Two other federal Acts dealng with potentially hazardous substances are the Toxic Substances Control Act (TOSCA), 15 U.S.C. §§ 2601-2629 (1982), and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), 7 U.S.C. §§ 136-136y (1982). These Acts, however, focus primarily on controlling the production and distribution (i.e., the manufacture and sale) of hazardous substances, rather than the methods of hazardous waste disposal. F. GRAD, 1A TREATISE ON ENVIRONMENTAL LAW § 4A.01 (1982). This Comment is concerned with the latter problem.

to adequately address the problem of groundwater pollution caused by injection wells.

A. *Federal Water Pollution Control Act*

By its terms, the FWPCA establishes an objective to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters"[52] by prohibiting the "discharge of toxic pollutants in toxic amounts."[53] Although it has been suggested that the FWPCA could be used to combat groundwater pollution by injection wells,[54] a series of cases seemingly has destroyed that possibility.

In *United States v. GAF Corp.*,[55] the EPA sought an injunction against GAF, alleging that GAF was drilling two deep wells to be used for disposal, by injection, of organic chemical wastes without EPA approval. The EPA claimed that GAF was required under the FWPCA to receive an EPA permit before the disposal could proceed.[56] The District Court for the Southern District of Texas, however, found otherwise. Citing the failure of Congress to pass the Aspin amendment,[57] the court held that it had "neither the authority nor the inclination to act where the Congress has conferred no jurisdiction."[58] Therefore, the FWPCA did not control the pollution of subsurface wells[59] and GAF was not required to obtain EPA approval.[60]

The district court in *GAF Corp.* did not determine whether surface water pollution caused by underground sources[61] should be governed

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52. 33 U.S.C. § 1251(a) (1982).

53. *Id.* § 1251(a)(3).

54. *See* Eckert, *EPA Jurisdiction Over Well Injection Under the Federal Water Pollution Control Act*, 9 NAT. RESOURCES LAW 455, 458 (1976).

> Another possible, considerably broader basis for federal control over well injection can be adduced which depends upon the proposition that well disposal control authority is inherent in the administrator's discretion to issue or deny a permit under § 402 [33 U.S.C. § 1342] of the FWPCA for a surface water discharge.

Id.

55. 389 F. Supp. 1379, 1380 (S.D. Tex. 1975).

56. *Id.* at 1380.

57. *Id.* at 1383. The Aspin amendment, so named because it was introduced by Rep. Aspin during House floor debate preceding passage of FWPCA, would have given the EPA specific enforcement powers over groundwater under FWPCA. *Id.* However, the House rejected the amendment. 118 CONG. REC. 10,669 (1972). The District Court for the Southern District of Texas used that rejection to support its contention in *GAF* that the FWPCA did not regulate groundwater. 389 F. Supp. at 1384.

58. 389 F. Supp. at 1384.

59. *Id.*

60. *Id.* at 1383.

61. *Id.* at 1384.

by the FWPCA.[62] Rather, it indicated that pollution of groundwater might be subject to FWPCA regulation if the EPA could prove that the polluted groundwater was in turn polluting surface water.[63] In 1977 this question was addressed by the Court of Appeals for the Fifth Circuit in *Exxon Corp. v. Train*.[64] The court found that the EPA had no control over disposal into groundwater[65] and that jurisdiction over groundwater regulation was vested in the states.[66] This holding, in conjunction with the *GAF Corp.* decision, indicates that the FWPCA offers little or no protection for groundwater resources.

B. *Safe Drinking Water Act*

Although section 1421 of the Safe Drinking Water Act (SDWA)[67] provides for the promulgation of EPA regulations for state underground injection programs, the Act[68] has failed to adequately protect groundwater resources from pollution by injection wells. The failure of the SDWA to protect groundwater comes from general deficiencies[69] in the Act, specific gaps in the regulation, and an EPA not always willing to take a tough approach with violators.[70]

Examples of loopholes opened for hazardous waste generators by the EPA are found in the amendments to the underground injection control (UIC) regulations promulgated under the SDWA.[71] The amendments, which became effective in February of 1983,[72] include the following redefinition of "underground source of drinking water":

> [A]n aquifer or its portion:
>
> 1. (i) Which supplies any public water system; or

62. *Id.* at 1383.

63. *See id.* at 1383-84. The court pointed out that § 502 of the FWPCA, 33 U.S.C. § 1362(12), defined discharge of a pollutant as "any addition of any pollutant to navigable waters from any point source." Therefore, if the pollutant could be traced back to the groundwater pollution source, so as to fulfill the requirement of a "point source" discharge, it could then be stopped under FWPCA.

64. 554 F.2d 1310 (5th Cir. 1977).

65. *Id.* at 1329.

66. *Id.* at 1330-31. For a detailed discussion of *Train*, see Comment, *supra* note 2, at 714-16.

67. 42 U.S.C. § 300h (1982).

68. *Id.* §§ 300f to 300j-10.

69. Some general problems in the SDWA are that the Act protects only drinking water resources from wells whose specific function is disposal of waste fluids. If the water is contaminated, the contamination must be shown to be a significant health hazard. *See* Rea, *supra* note 6, at 444, 455-56.

70. *See Reauthorization Hearings*, *supra* note 1, at 25.

71. *See* 40 C.F.R. §§ 122.3-.42, 146.3-.34 (1982).

72. *Id.*

(ii) Which contains a sufficient quantity of ground water to supply a public water system; and
(A) Currently supplies drinking water for human consumption; or
(B) Contains fewer than 10,000 mg/l total dissolved solids; and
2. Which is not an exempted aquifer.[73]

Under the amended definition of "underground source of drinking water," the phrase "public water systems"[74] excludes water sources which are too small to supply a "public" water system.[75] This exclusion means that many people using rural and private wells which draw from relatively small sources of groundwater are not protected under the SDWA.[76]

The amendments also give broader discretion to the EPA Administrator in deciding which aquifers have no real potential to be used as drinking water and thus should be exempt from the protection of the SDWA.[77] If the Administrator finds an aquifer to be unusable for any of a variety of reasons,[78] then it is exempt and may be used for an injection disposal site.[79] In addition, criteria for exemption designation have been loosened to allow exemptions to be assigned to aquifers with a total dissolved solids (TDS) content of more than 3000 and less than 10,000 milligrams per liter (mg/l).[80] The modified exemption criteria circumvent the amended definition of underground source of drinking water[81] and permit groundwater resources with relatively low mineral content to be exempt from regulation.[82] This means that potential un-

73. *Id.* § 122.3.
74. *Id.* § 122.3(1)(i).
75. *Id.* § 122.3(1)(ii).
76. Instances of pollution of small underground sources have been reported. *See Contamination Hearings*, *supra* note 20, at 223-27; *NRDC, States Criticize Proposed Revision*, *supra* note 30, at 1146-47.
77. *See* 40 C.F.R. § 122.31(d) (1982); 46 Fed. Reg. 48,245 (1981)(supplementary information).
78. An aquifer may be designated unusable upon the Administrator's determination that it falls into one of the following categories:
1. Mineral, hydrocarbon or geothermal energy producing.
2. Situated at a depth or location which makes recovery of water for drinking purposes economically or technologically impractical.
3. So contaminated that it would be economically or technologically impractical to render the water fit for human consumption; or
4. Located over a Class III mining area subject to subsidence or catastrophic collapse.
40 C.F.R. § 146.4(b) (1982).
79. *Id.*
80. *See id.* § 146.4(c).
81. *Id.* § 122.3; see text accompanying note 73 *supra*.
82. *See supra* notes 73-75 and accompanying text. Exxon praised the relaxation of the dis-

derground sources of drinking water containing concentrations between 3000 mg/l and 10,000 mg/l, which were protected under the SDWA before the amendments, are subject to exemption if the EPA Administrator feels that "economic and hydrologic circumstances" warrant such exemptions.[83]

The 1982 amendments also change injection well classifications under the SDWA.[84] Wells now are divided into five classifications, based on the particular use of the well. Class I wells are those injecting hazardous waste beneath the lowest groundwater-containing strata, and which have the well bore located within one-fourth mile of a groundwater resource.[85] Class II wells include those used in oil and gas production. These wells act to "enhance recovery of oil or gas" or to store hydrocarbons.[86] Class III includes wells used to extract minerals.[87] Class IV wells are used to inject hazardous waste or radioactive waste into formations within one-fourth mile of underground sources of drinking water.[88] This class includes those wells injecting hazardous waste into or above a formation which contains an exempted aquifer.[89] Class V wells include injection wells not in Classes I through IV.[90]

Prior to the amendments, wells which were used to inject hazardous waste, but which did not inject such waste into, through, or above underground drinking water, were in Class I. However, under the amendments these wells became Class IV wells.[91] The redesignation is important because it transfers these wells from a class with very stringent guidelines in such areas as well as construction,[92] operation,[93]

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solved solid standards: "EPA has recognized that aquifers with fewer than 10,000 mg/l TDS must be considered on a case-by-case basis in order to eliminate those zones not reasonably expected to supply a public water system." *NRDC, States Criticize Proposed Revision*, *supra* note 30, at 1146. However, Florida's Department of Environmental Regulation warned that exempting their phosphate-rich aquifers in southwestern Florida might jeopardize future water supplies, as economics make these aquifers feasible to use. *Id.* Furthermore, the change in exemption criteria was made despite EPA recognition that water with a TDS as high as 9000 mg/l is now being used to supply public water systems. 46 Fed. Reg. 48,245 (1981) (supplementary information). Thus, other aquifers containing a TDS between 3000 mg/l and 10,000 mg/l now may be lost to contamination under the amended regulations, whereas they previously would have been afforded protection from contamination under the SDWA. *See* 40 C.F.R. § 146.4 (1980).

83. 46 Fed. Reg. 48,244 (1981) (supplementary information).
84. 40 C.F.R. § 146.5 (1982).
85. *Id.* § 146.5(a).
86. *Id.* § 146.5(b).
87. *Id.* § 146.5(c).
88. *Id.* § 146.5(d).
89. *Id.* § 146.5(d)(3). Exemptions are discussed *supra* notes 78-82 and accompanying text.
90. *Id.* § 146.5(e). Typical Class V wells are discussed *supra* note 24.
91. 46 Fed. Reg. 48,245 (1981) (supplementary information).
92. Construction requirements include extensive oversight in determining the design and

monitoring,[94] and reporting,[95] into a class whose criteria and standards have not yet been promulgated.[96]

Further, Class II regulations have been relaxed to allow nonhazardous waste water from gas plants to be injected into underground sources of drinking water.[97] Such practices previously have not been allowed.[98] The EPA, however, argues that the "very low total dissolved solids levels [in] the brine does not increase the risk to underground sources of drinking water."[99]

Finally, the amendments allow the operation of Class IV wells[100] under specified conditions.[101] Originally, a complete ban on Class IV wells was considered by the EPA,[102] but the recent revision authorizes operation of Class IV wells which do not pump hazardous waste directly into underground sources of drinking water.[103] This change in regulation allows wells injecting hazardous waste above or near underground drinking water sources to continue to operate[104] despite the possibility that hazardous waste may migrate into nearby aquifers or aquifers below the injection zone.[105] In sum, the loopholes created by the 1982 amendments of the SDWA regulatory scheme have greatly

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type of casing which will be used in each well. The casing insures against leakage of hazardous waste as it travels down the well. 40 C.F.R. § 146.12(b) (1982).

93. Operation of Class I injection wells cannot exceed certain pressure guidelines during injection. High pressure injection can fracture casings and cause leakage. *Id.* § 146.13(a).

94. Class I monitoring requirements include regular analysis of the injected waste; installation of devices to measure flow rate, pressure and volume; inspection of the well every five years for mechanical integrity; and development of a plan to monitor migration of waste fluids into groundwater in the area. *Id.* § 146.13(b).

95. Reports on Class I wells must be made quarterly concerning physical, chemical, and other relevant characteristics of injected fluid. In addition, monthly reports on injection pressure, flow rate, and volume are required. Results of groundwater monitoring must be reported, as well as maintenance work performed on the well. *Id.* § 146.13(c).

96. *See id.* § 146 ("Subpart E—Criteria and Standards Applicable to Class IV Injection Wells [Reserved]").

97. 46 Fed. Reg. 48,245 (1981) (supplementary information).

98. *Id.*

99. *Id.*

100. Class IV wells include the following:

> Wells used by generators of hazardous waste or of radioactive waste, by owners or operators of hazardous waste management facilities, or by owners or operators of radioactive waste disposal sites to dispose of hazardous waste or radioactive waste into a formation which within one quarter (1/4) mile of the well contains an underground source of drinking water.

40 C.F.R. §§ 122.32(d)(1), 146.5(d)(1) (1982).

101. *See id.* § 122.37(3).

102. 46 Fed. Reg. 48,244 (1981) (supplementary information).

103. *Id.*

104. *Id.*

105. *Id.* The practice of injecting hazardous waste above aquifers used for drinking water also has caused concern. *See NRDC, States Criticize Proposed Revision*, *supra* note 30, at 1147.

diminished the Act's effectiveness in fighting groundwater pollution by injection wells.

C. *Resource Conservation and Recovery Act*

In 1976 Congress passed the Resource Conservation and Recovery Act[106] (RCRA), the most comprehensive legislation and regulatory scheme of its kind to date. The goals of the RCRA include "regulating the treatment, storage, transportation, and disposal of hazardous wastes"[107] and "promoting the demonstration, construction, and application of solid waste management, resource recovery, and resource conservation systems which preserve and enhance the quality of air, water and land resources."[108]

However, the RCRA has not been a shining success in protecting groundwater. The Act has many problems in this regard, largely due to gaping loopholes which inhibit its effective prevention of groundwater pollution.[109] For example, small generators of hazardous waste are exempt from the RCRA.[110] A generator of hazardous waste is considered "small" if it generates less than 1000 kilograms (approximately 2200 pounds) in a calendar month.[111] This exemption alone legalizes the disposal of a potential 1.54 billion pounds of hazardous waste each month.[112] When this flaw in the RCRA is coupled with the change in the SDWA definition of "underground source of drinking water,"[113] small rural underground water supplies are left virtually unprotected against pollution. Since nearly all rural U.S. inhabitants receive their drinking water from underground sources,[114] this lack of regulatory protection may prove disastrous.

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106. 42 U.S.C. §§ 6901-6987 (1982).

107. *Id.* § 6902(4).

108. *Id.* § 6902(7).

109. The overload of paper work caused by the manifest system (defined *infra* note 132), the number of hazardous waste sites which are nearly impossible to monitor, and the inadequacy of the list of prohibited waste all hinder the effectiveness of the RCRA. Rea, *supra* note 6, at 457-58.

110. 40 C.F.R. § 261.5(b) (1982).

111. *Id.* § 261.5(a). When determining the 1000 kilograms, the generator is not required to include "(1) His hazardous waste when it is removed from on-site storage;" or "(2) Hazardous waste produced by on-site treatment of his hazardous waste." *Id.* § 265.1(d).

112. *Reauthorization Hearings*, *supra* note 1, at 31. Rita Lavelle, former Assistant Administrator for Solid Waste and Emergency Response for the EPA, told a House subcommittee conducting hearings on the reauthorization of RCRA that many of these small generators were homes and gas stations. Some congressmen were skeptical of the accuracy of this testimony, given the large amount of hazardous waste which could be generated per month. *See id.* at 30-31 (statement of Sen. Chafee).

113. *See supra* note 73 and accompanying text.

114. *See Contamination Hearings*, *supra* note 20, at 260, 339.

Other major problems with the RCRA include delays in promulgation of regulations[115] and the handling by the EPA of the interim authorization program for hazardous waste facilities.[116] The RCRA requires hazardous waste operations to submit applications in order to receive interim status. This process is intended to insure that the operations meet certain minimum standards.[117] The General Accounting Office, however, has reported that the application system has failed to produce compliance,[118] citing the EPA's lack of follow-up, shortage of funding and manpower to monitor sites, and failure to assess penalties against violators of the regulation standards.[119]

Thus, lax EPA enforcement, loopholes in the regulations themselves and the shrinking budget for environmental protection have seriously hampered federal control of groundwater pollution. As a result, in many areas the task of finding new ways to protect environmental resources has been left to the states alone.

IV. STATE GROUNDWATER PROTECTION PROGRAMS

A. *Authorization of State Programs*

Under the RCRA, states may promulgate their own hazardous waste programs,[120] as long as the states adhere to the provisions of the RCRA.[121] States also may develop programs "more stringent than" the federal program.[122] Similarly, under section 1422 of the SDWA,[123] states may implement their own underground injection control (UIC) programs.[124] Again, however, in order to gain EPA approval, state UIC programs must be at least as stringent as the federal UIC program. States which already have gained EPA approval for local UIC programs include Oklahoma,[125] Texas[126] and Arkansas.[127]

115. *See* Rea, *supra* note 6, at 457.

116. EPA may confer interim status on hazardous waste facilities which were operating on Nov. 19, 1980. 40 C.F.R. § 122.3 (1982). Rep. Florio's opinion of the interim status program was strongly worded: "We are facing a national chemical nightmare and this Administration is treating it like a joke." *Florio, GAO Say Interim Status Rules Do Not Protect Public Health, Environment*, [12 File Binder] ENV'T REP. (BNA) 679 (Oct. 2, 1981).

117. 40 C.F.R. § 122.23(a)(2) (1982).

118. *See Interim Status Rules*, *supra* note 116, at 679.

119. *Id.*

120. 42 U.S.C. § 6926(b) (1982).

121. 45 Fed. Reg. 33,378 (1980) (supplementary information).

122. *Id.* at 33,377; *see* 42 U.S.C. § 6926 (1982).

123. 42 U.S.C. § 300h (1982).

124. *Id.*

125. 46 Fed. Reg. 58,489 (1981) (approving UIC for Class II wells); 47 Fed. Reg. 27,273 (1982) (approving UIC for Classes I, III and IV wells).

Problems arise for the state that attempts controls "more stringent than" those uniformly required by the federal government. Regulated industries not wishing to comply with the stricter standards may either move their operation to states with programs no more stringent than federal programs,[128] or challenge the stricter state program in court.[129] In uncertain economic times, such prospects provide a strong disincentive for states to enact "more stringent than" regulations to fill gaps in federal programs.[130]

B. *Interstate Cooperation*

In order to insure that states may more stringently regulate injection well pollution without putting themselves at an economic disadvantage, greater cooperation among states is necessary. Examples of interstate cooperation already have surfaced through the adoption of regional uniform manifest systems.[131] Under the RCRA, states are required to develop manifest systems.[132] Generators of hazardous waste

126. 47 Fed. Reg. 618 (1982).

127. *Id.* at 29,236.

128. *See Reauthorization Hearings*, *supra* note 1, at 34.

129. *Id.* at 130. In Homestake Min. Co. v. EPA, 477 F. Supp. 1279 (D.S.D. 1979), a South Dakota mining company challenged South Dakota's implementation of the FWPCA, which mandated stricter permit limitations for effluent discharge into streams than did the federal requirements. Homestake argued that South Dakota could not limit effluent discharge more than federal regulations required. The court disagreed, and held that although states were prohibited from failing to meet minimum regulations established by the federal government, states were not prohibited from setting standards more strict than the federal regulations. *Id.* at 1283.

130. *Reauthorization Hearings*, *supra* note 1, at 132. In order to avoid the economic disadvantages and the political problems caused by state regulations which are "more stringent than" federal regulation, aggrieved states also might attempt to sue the EPA to force it to comply with specific procedural provisions of the RCRA and the SDWA. States already have gained relief from the judiciary as a result of EPA's failure to comply with the intent of Congress in enacting environmental legislation. In New York v. Gorsuch, 554 F. Supp. 1060 (S.D.N.Y. 1983), the state of New York sought an injunction to force the EPA Administrator to comply with § 112(b)(1)(B) of the Clean Air Act, 42 U.S.C. § 7412(b)(1)(B). Congress had directed the Administrator to determine if airborne inorganic arsenic posed a health threat. Although the Administrator found the pollutant hazardous and placed it on the hazardous pollutant list, she failed to comply with § 112(b)(1)(B) by not promulgating regulations for the pollutant within 180 days after it was placed on the list. 554 F. Supp. at 1061-62. The court found that the Administrator had acted outside of her discretion by failing to follow "an unconditional congressional mandate," and ordered her to publish the required regulation. *Id.* at 1066.

This approach may be of limited help, however, as the court also noted that, had the suit involved a discretionary provision within the Act, it likely would defer to the "wisdom of the Administrator." *Id.*

131. *Six New England States Agree To Adopt Uniform Manifest For Hazardous Waste*, [11 File Binder] ENV'T REP. (BNA) 332 (July 4, 1980). The states are Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island. "Manifest" is defined *infra* note 132.

132. *See* 42 U.S.C. §§ 6922(5), 6926 (1982). A "manifest" is comprised of documents prepared by the hazardous waste generator, pursuant to EPA guidelines. 40 C.F.R. § 262.21 (1982). Mani-

to off-site treatment, storage, or disposal facilities are required to prepare[133] and carry a copy of the manifest with each transport of hazardous waste.[134] A copy must be left with the owner of the designated facility and another copy must be returned to the generator.[135] The manifest must contain the generator's name, mailing address, telephone number and his EPA identification number.[136] It must also contain the name and EPA identification number of the transporter and designated facility,[137] the total quantity of hazardous waste by weight and volume, the type and number of containers being transported,[138] and a statement that the containers have been "properly classified, described, packaged, marked and labeled."[139] The manifest system insures that hazardous waste can be accounted for regardless of its location, and thereby protects against illegal dumping.

Six states in New England have agreed to use uniform manifest systems.[140] The uniform system will insure better enforcement by tracking interstate transporters of hazardous waste and by providing a means by which states can notify each other if a shipment does not arrive at its stated destination.[141] The uniform approach will simplify management of the programs, reduce conflicting or duplicate paper work,[142] and thus should lower the cost of the programs. This kind of cooperative approach to manifest systems could be utilized in resolving the problems posed by injection of hazardous waste. States would agree to adopt uniform legislation protecting their groundwater from pollution by injection. A state then could avoid being placed at an economic disadvantage because of its attempt to control injection well pollution of groundwater.

Interstate water compacts, authorized by Congress,[143] provide another potential model for interstate cooperation. Compacts have been created to avoid interstate conflict over the use of surface waters such

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fest are used to monitor the generation, transportation, and disposal or storage of hazardous wastes within the state.

133. 40 C.F.R. § 262.20(a) (1982).
134. *Id.* § 262.22.
135. *Id.*
136. *Id.* § 262.21(2).
137. *Id.* §§ 262.21(a)(3), (a)(4).
138. *Id.* § 262.21(a)(6).
139. *Id.* § 262.21(b).
140. *See Six New England States*, *supra* note 131, at 332.
141. *Id.*
142. *Id.*
143. F. ZIMMERMAN & M. WENDELL, THE LAW AND USE OF INTERSTATE COMPACT 19-26 (1976).

as major rivers or border-straddling lakes. The Red River Compact, executed in 1978 by Oklahoma,[144] Arkansas,[145] Louisiana[146] and Texas,[147] exemplifies such an agreement. The Compact's primary purpose is the promotion of "an active program for the control and alleviation of natural deterioration and pollution of the water of the Red River Basin and to provide for enforcement of the laws related thereto."[148]

A similar compact could be developed for states with common groundwater concerns. States which use common aquifers, or which are within the recharge zone of a common aquifer, might develop a regional groundwater pollution-control agreement containing standards more stringent than federal regulations for injection well control. Such agreements would reduce groundwater contamination, as well as the negative economic and political effects of regulation on individual states.

V. REGULATION AT THE STATE LEVEL

Although the regulatory enforcement horizon appears brighter with the appointment of William Ruckelshaus as EPA Administrator,[149] until major federal action is taken states still will need to act to protect their groundwater resources. Many states have, in spite of economic and political pressures, pursued legislative remedies to bolster sagging EPA guidelines. An example of "more stringent than" federal regulation is the action taken to offset federal exemption of small generators of hazardous waste.[150] Some states have reduced the amount of hazardous waste an exempt small generator can produce to 200 kilograms per month (kg/mo.),[151] while others have reduced the amount to

144. OKLA. STAT. tit. 82, § 1431 (1981).

145. ARK. STAT. ANN. §§ 9-1601 to -1603 (Supp. 1983).

146. 1978 La. Acts 71.

147. TEX. WATER CODE ANN. §§ 46.001-.013 (Vernon Supp. 1982-1983).

148. RED RIVER COMPACT, art. I, § 1.01(c) (1978), *reprinted in* OKLA. STAT. tit. 82, § 1431, at 5876 (1981).

149. Although some environmentalists are skeptical, many think that Ruckelshaus will be a moderating influence in the EPA. Taylor, *An Old Hand Tries to Clean Up Mess at EPA*, U.S. NEWS AND WORLD REP., April 4, 1983, at 49-50. Ruckelshaus also has shown concern for regulating hazardous waste. *Welcome Back, Bill Ruckelshaus*, BUS. WEEK, April 4, 1983, at 30. While testifying before the House Subcommittee on Environment, Energy and Natural Resources, Ruckelshaus said that groundwater pollution was "near the top" of the EPA priorities list. 13 OKLA. ENERGY ENV'T REP., No. 27, p. 11 (July 6, 1983).

150. *See supra* notes 110-14 and accompanying text.

151. These states are Indiana and Washington. *Reauthorization Hearings*, *supra* note 1, at 451, 461. In comparison, the RCRA permits a generator to produce 1000 mg/mo. before compliance is necessary. 40 C.F.R. § 261.5(a) (1982).

100 kg/mo.[152] California, Louisiana and Minnesota allow no exemptions for small generators.[153] Obviously, this type of "more stringent than" legislation also could be applied to other deficiencies.

In lieu of "more stringent than" legislation, state courts might make use of common law causes of action in strict liability[154] and public nuisance[155] to protect citizens from groundwater pollution by injection wells. The use of the federal common law of nuisance, however, has been seriously limited by recent decisions, such as *City of Milwaukee v. Illinois*[156] and *United States v. Reilly Tar & Chemical Corp.*,[157] holding that federal common law nuisance actions have been preempted by federal environmental legislation. Federal courts also have ruled specifically that the federal common law of nuisance has been preempted by "comprehensive" federal legislation in the hazardous waste disposal area.[158] However, state tort actions still are available in hazardous waste cases.

In *State v. Monarch Chemicals, Inc.*,[159] the state of New York and two other plaintiffs sued Monarch Chemical under strict liability and public nuisance theories for contamination of soil and groundwater in the town of Vestal, New York, the site of Monarch's disposal plant.[160] Monarch contended that the state lacked standing to bring the law suit, due to the "exhaustive procedure for abating water pollution . . . provided in the [New York] Environmental Conservation Law."[161] The court held that the New York statute contained a savings clause, and therefore the state had preserved common law remedies.[162] Moreover, despite Monarch's claim that New York's public nuisance law was pre-

152. These states are Illinois, Missouri, Kansas, New Hampshire, New Jersey and Oregon. *Reauthorization Hearings*, *supra* note 1, at 451-60.

153. *Id.* at 449, 452, 454.

154. *See* Note, *Strict Liability for Generators, Transporters and Disposers of Hazardous Wastes*, 64 MINN. L. REV. 949, 967-77 (1980) (also discussing potential causes of action under trespass, nuisance, negligence, and products liability theories).

155. *See* Comment, *Hazardous Wastes: Preserving the Nuisance Remedy*, 33 STAN. L. REV. 675 (1981); Note, Watson v. Great Lakes Pipeline Company—*A Public Nuisance Approach to Water Pollution*, 16 S.D.L. REV. 510 (1971).

156. 451 U.S. 304 (1981).

157. 546 F. Supp. 1100 (D. Minn. 1982).

158. *E.g.*, City of Philadelphia v. Stepan Chem. Co., 544 F. Supp. 1135, 1148 (E.D. Pa. 1982); United States v. Price, 523 F. Supp. 1055, 1069 (D.N.J. 1981), *aff'd*, 688 F.2d 204 (3d Cir. 1982). For a discussion of the intrusions which legislation has made on the use of common law causes of action to control hazardous waste, see generally Comment, *Hazardous Waste Disposal: Is There Still a Role for Common Law?*, 18 TULSA L.J. 448 (1983).

159. 90 A.D.2d 907, 456 N.Y.S.2d 867 (1982).

160. *Id.* at —, 456 N.Y.S.2d at 868.

161. *Id.* at —, 456 N.Y.S.2d at 869.

162. *Id.*

empted by federal regulations, the New York court held that neither the SDWA nor the RCRA precluded state enforcement in the hazardous waste area.[163]

In *Branch v. Western Petroleum, Inc.*,[164] strict liability[165] was used to recover punitive and actual damages resulting from the percolation of oil well formation water[166] into an underground water source. Western had been disposing of the waste water produced by their oil well into a gravel pit near the Branch farm.[167] The contaminants from the water in the pit leached into the soil, and eventually into the underground water source which supplied the farm.[168] The Utah Supreme Court held that the dumping of the water by Western was, under the circumstances, an unduly dangerous activity;[169] therefore, Western was held strictly liable for the consequences.[170] Finally, in *Watson v. Great Lakes Pipeline Co.*[171] the South Dakota Supreme Court held that fuel escaping from underground storage tanks constituted a public nuisance when the escaping fuel contaminated nearby wells.[172]

Although both nuisance and strict liability theories may be used by states to motivate injection well operators to refrain from polluting groundwater sources, common law solutions have inherent problems which may make them a less desirable remedy than state regulatory programs. Before a tort action will be sustained there must be an injury to the plaintiff or her property.[173] This basic element of a tort action makes common-law solutions generally compensatory rather than preventative. The compensatory nature of a common law solution is extremely troublesome when dealing with groundwater pollution.

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163. *Id.*

164. 657 P.2d 267 (Utah 1982).

165. In a similar action, New York state has filed a public nuisance suit against General Electric Co. for the contamination of ground and drinking water in Moreau, N.Y. The state seeks not only abatement of the nuisance, $30 million in damage, and a civil penalty of $10,000 per day for each violation of New York law, but also restitution of $5 million spent by the state on investigation, administration, and other costs of the case. State v. General Electric Co., [PENDING LITIGATION BINDER] ENVTL. L. REP. (ENVTL. L. INST.) 65,774 (filed Nov. 9, 1982). However, in State v. Schenectady Chemicals, Inc., 13 ENVTL. L. REP. (ENVTL. L. INST.) 20,550 (Feb. 18, 1983), the New York Department of Environment Conservation was denied restitution for costs incurred. *Id.*

166. Oil well formation water is waste water from oil wells containing various chemical contaminants. *Branch*, 657 P.2d at 270.

167. *Id.*

168. *Id.* at 270-71.

169. *Id.* at 274.

170. *Id.* at 275.

171. 85 S.D. 310, 182 N.W.2d 314 (1970).

172. *Id.* at —, 182 N.W.2d at 319.

173. W. PROSSER, HANDBOOK OF THE LAW OF TORTS § 1, at 6 (4th ed. 1971).

Once a groundwater source is polluted, it may be very difficult and expensive—if not impossible—to clean up.[174] Therefore, preventative measures such as regulation and monitoring of hazardous waste can prove much more cost effective than common law actions initiated after a groundwater source is contaminated.[175]

The causation element of common law torts also poses a special problem in groundwater pollution cases. Groundwater movement cannot always be predicted.[176] When there are many possible sources of groundwater pollution in an area it may be difficult to determine which source caused the particular contamination unless a particularly unusual contaminant is present.[177] Because there often is little movement within an aquifer,[178] contaminants may migrate very slowly and not pollute a given well until many years after the actual injection of waste. The passage of time may make it very difficult for the aggrieved party to show a causal link between the injection of the waste and the contamination of his water source.

Strict liability and public nuisance theories also present some unique problems in addition to the problems of torts generally. The strict liability theory may be unavailable or severely limited in some jurisdictions.[179] Further, states are inherently limited when bringing a public nuisance cause of action because the requisite harm must affect a sufficient number of people to be a public, rather than private, nuisance.[180] This means that plaintiffs who might need state protection the most may not receive it.[181] Thus, even though the common law may be available to a state as an interim remedy to groundwater pollution by injection wells, the common law alone does not provide adequate protection or deterrence.[182]

Finally, states may wish to bring criminal proceedings against pollutors. This is a harsh but effective means of controlling pollution of groundwater. The RCRA imposes criminal penalties on any person transporting, storing or disposing of designated hazardous waste with-

174. *See supra* note 29 and accompanying text.

175. *See* Comment, *supra* note 2, at 699 (discussing extraordinary length of time required for groundwater to repurify itself, and virtual impossibility of purification through human effort).

176. *See* W.R. WALKER & W.E. COX, *supra* note 25, at 7.

177. *See Contamination Hearings*, *supra* note 20, at 220-35.

178. *See* Comment, *supra* note 2, at 699.

179. *See, e.g.*, Sun Pipe Line Co. v. Kirkpatrick, 514 S.W.2d 789, 792 (Tex. Civ. App. 1974); Rea, *supra* note 6, at 466.

180. *See* W. PROSSER, *supra* note 173, § 88, at 585.

181. *See supra* notes 73-76 and accompanying text.

182. *See* Comment, *supra* note 158.

out a permit.[183] In addition, many states have enacted strong criminal penalties for violators of state hazardous waste regulations.[184] Criminal penalties similarly could accompany strict state regulation of injection. Such penalties, possibly even including prison terms, might act as a greater deterrent than would mere fines or monetary settlements.

VI. CONCLUSION

As the use and value of groundwater has increased, more attention is being focused on protecting this important resource. The federal government has enacted legislation such as the Federal Water Pollution Control Act, the Safe Drinking Water Act, and the Resource Conservation and Recovery Act. However, budget cuts in the implementation of programs, loopholes in the acts, and a less-than-responsive EPA have rendered these federal programs inadequate to protect groundwater sources from pollution by hazardous injection wells. Until more potent federal action is taken, states must themselves take action to protect groundwater from pollution by injection wells. Such state action must foster an atmosphere of interstate and regional cooperation in setting regulatory standards for injection wells. States also should consider the use of common law causes of action against hazardous waste generators and transporters, as well as injection well operators. In addition, states are free to employ criminal penalties as deterrents to would-be polluters of underground water resources. Most importantly, however, states must take the initial step of understanding that they—and not the federal government—are ultimately responsible for their own destinies in groundwater management and pollution control.

Alan W. Gentges

183. *See* 42 U.S.C. § 6928(d) (1982).

184. *E.g.*, ARK. STAT. ANN. §§ 82-4212 to -4213 (Supp. 1983); ILL. ANN. STAT. ch. 111½ § 1004 (Smith-Hurd Supp. 1983-1984); KAN. STAT. ANN. §§ 65-3409, -3419 (1980); N.Y. ENVTL. CONSERV. LAW § 71-1933 (McKinney Supp. 1982-1983); OKLA. STAT. tit. 82, § 937 (1981).