

ties hesitate to site waste repositories opposed by local residents.²⁴⁷ Under any of the three legislative proposals, just as under present law, the cooperation of state and local authorities is necessary for successful waste management.

E. Conclusion

A cooperative effort between states and the federal government is essential for a comprehensive nuclear waste disposal program. Problems exist in the current regulatory framework for high-level wastes. Presently, hazardous and risk-laden evaluations are sheltered from direct state participation. States are willing to assume a more meaningful role in waste regulation. Unless Congress grants states an effective role in waste decisions, however, permanent repositories will not be sited.

III. UNDERGROUND WASTE INJECTION NANCY HENTIG

A. Introduction

During the 1970's public concern about the quality of the environment grew. Congress responded with several programs aimed at studying and controlling man's effect on the environment.²⁴⁸ To protect the underground sources of drinking water,²⁴⁹ Congress passed the Safe Drinking Water Act of 1974 (SDWA).²⁵⁰ The act's Underground Injection Control Program²⁵¹ enables the EPA to regulate a major source of groundwater pollution in order to ensure safe drinking water.²⁵²

The law has traditionally made a strict distinction between under-

247. See notes 153, 159 and accompanying text *supra*.

248. Some of the acts passed by Congress during the 1970's are The Endangered Species Act of 1973, 16 U.S.C. §§ 1531-43 (1976), The Wild and Scenic Rivers Act, 16 U.S.C. §§ 1271-87 (1976), The Air Pollution Prevention and Control Act of 1977, 42 U.S.C. §§ 7401-7642 (1976 & Supp. I 1977), and The Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901-87 (1976 & Supp. III 1979).

249. See *Safe Drinking Water Act Oversight: Hearing Before the Subcomm. on Environmental Pollution of the Comm. on Environmental and Public Works, United States Senate*, 95th Cong., 2d Sess. 5 (1978) [hereinafter cited as *SDWA Oversight*] (statement of Thomas C. Jorling).

250. 42 U.S.C. §§ 300f-j (1976 & Supp. III 1979).

251. Subtitle C, Underground Injection Control Program, 42 U.S.C. §§ 300f, 300h (1976).

252. See *SDWA Oversight, supra* note 249, at 225 (statement of Jacqueline M. Warren).

ground and surface waters, treating them as separate resources.²⁵³ Scientists, on the other hand, recognize that groundwater is only a single phase in a closed, hydrologic cycle.²⁵⁴ Water which percolates downward through the soil reaches a layer of porous rock, the aquifer. The groundwater then flows slowly²⁵⁵ through the aquifer until it reaches a discharge point at a stream, river, lake or ocean.²⁵⁶

Since aquifers supply, in whole or in part, 77% of this country's drinking water, groundwater pollution poses a serious health hazard.²⁵⁷ Unlike surface waters, groundwater does not naturally self-cleanse since it is not aerated and lacks microorganisms.²⁵⁸ In addition, aquifers do not flush themselves clean as do swifter moving surface waters. Indeed, because groundwater flows so slowly, an aquifer may remain contaminated long after the polluting activity has ceased.²⁵⁹ Ironically the EPA's efforts to clean up the nation's air and surface waters have forced polluters to dispose of their wastes in ways which increase the danger of groundwater pollution.²⁶⁰

253. "The secret, changeable, and uncontrollable character of underground water in its operation is so diverse and uncertain that we cannot well subject it to the regulations of law . . . as is done in the case of surface streams." *Chaffield v. Wilson*, 28 Vt. 49, 54 (1855). *Contra*, *Perkins v. Kramer*, 148 Mont. 355, 362, 423 P.2d 587, 591 (1967) (modern hydrology has obviated the need for the traditional, legal distinctions between groundwater and surface water). See R. CLARK, *WATERS AND WATER RIGHTS* § 3.1. (1967)

254. NATIONAL WATER COMMISSION, *WATER POLICIES FOR THE FUTURE* 246 (1973) [hereinafter cited as *WATER COMMISSION*].

255. Although most groundwater flows at a rate inches per day, it may, depending on the gradient, proceed more rapidly. Underground leakage from a sewage lagoon in Missouri travelled 20 miles in 12 days on its way into Arkansas. MISSOURI DEPARTMENT OF NATURAL RESOURCES, *MISSOURI WATER QUALITY REPORT* 55 (1980).

256. For a diagrammatic presentation of the hydrologic cycle, see Comment, *Groundwater Pollution in South Dakota: A Survey of Federal and State Law*, 23 S.D.L. REV. 698, 703 n.42 (1978).

257. Uncontrolled disposal of hazardous materials has contaminated groundwater throughout the nation. Regulating groundwater when it is a direct source of drinking water is not enough. Where groundwater flows into surface waters which provide drinking water, the groundwater must be regulated also. See *SDWA Oversight*, *supra* note 249, at 225-27 (statement of Jacqueline M. Warren) (Examples of groundwater contamination are also listed.).

258. See *SDWA Oversight*, *supra* note 249, at 225; GENERAL ELECTRIC, *POLLUTED GROUND WATER, SOME CAUSES, EFFECTS, CONTROLS AND MONITORING* 5-23 (1973).

259. *WATER COMMISSION*, *supra* note 254, at 243; [1977] 7 ENVIR. REP. (BNA) 1805; EPA PROFILE OF ENVIRONMENTAL QUALITY—MISSOURI 15 (1980).

260. See [1977] 7 ENVIR. REP. (BNA) 1805; *Reserve Mining Co. v. EPA*, 514 F.2d

B. *Underground Injection*

The direct discharge of liquid waste into the ground through septic tanks²⁶¹ and injection wells is the largest source of ground water pollution.²⁶² An injection well is simply a "well" into which 'fluids' are being injected."²⁶³ Injection wells serve in the disposal of industrial wastes, sewage effluent, cooling water and stormwater by discharging them as groundwater.²⁶⁴ In the United States, there are 4,000 shallow wells²⁶⁵ and 200 deep wells in operation.²⁶⁶ Most deep wells are designed to inject industrial or municipal washes into saltwater aquifers, thereby posing no threat to freshwater supplies.²⁶⁷ A significant

492, 538 (8th Cir. 1975) (Polluter enjoined from discharging into surface water, must find on-land disposal site).

261. See EPA, REPORT TO CONGRESS, WASTE DISPOSAL PRACTICES AND THEIR EFFECTS ON GROUND WATER 508 (1977) [hereinafter cited as EPA REPORT]. According to EPA estimates, a septic system density of more than forty per square mile creates the potential of groundwater contamination. *Id.* at 190-92.

262. Tripp & Jaffe, *Preventing Groundwater Pollution: Toward a Coordinated Strategy to Protect Critical Recharge Zones*, 3 HARV. ENV'T L. REV. 1, 4 (1979).

263. 40 C.F.R. § 122.3 (1981).

Congress intended the definition of underground injection to be broad enough to cover "any contaminant which may be put below ground level and which flows or moves, whether the contaminant is in semi-solid, liquid, sludge or any other form or state." Furthermore, the definition is not to be limited to injections for disposal purposes. H.R. REP. NO. 1185, 93d Cong., 2d Sess., reprinted in [1974] U.S. CODE CONG. & AD. NEWS 6457. See Tripp & Jaffe, *supra* note 262, at 4. The regulations for the UIC program define groundwater as "water below the land surface in a zone of saturation." 40 C.F.R. § 122.3 (1981).

264. See *Rollins Env't'l Servs. of La. v. Iberville Parish Policy Jury*, 365 So.2d 497 (La. App. 1978) (parish unsuccessfully attempted to regulate well injection disposal). See also Tripp & Jaffe, *supra* note 262, at 6.

265. See Tripp & Jaffe, *supra* note 262, at 7.

266. According to one report, deep wells range from a few hundred feet to twelve thousand feet. The depth depends on what depth is necessary to reach a porous, permeable, salt-water bearing stratum contained vertically by relatively impermeable beds. See D. WARNER, PUBLIC HEALTH SERVICE, U.S. DEP'T OF HEALTH, EDUCATION, AND WELFARE, DEEP WELL INJECTION OF LIQUID WASTE (1965), reprinted in *Water Pollution Control Legislation: Hearings on S.75 et al. Before the Subcomm. on Air and Water Pollution of the Senate Comm. on Public Works*, 92d Cong., 1st Sess., pt. 7, at 3354 (1971).

267. Deep well injection is especially important in the field of oil and gas production. These resources often occur in close proximity to brine. The oil industry pumps as much as 300 billion gallons of brine into deep wells. EPA REPORT, *supra* note 261, app. A. Congress exempted oil and gas production by-products from the definition of pollutant in the Federal Water Pollution Control Act:

The term "pollutant" . . . does not mean . . . (B) water, gas, or other material

number, however, inject a high volume of less hazardous wastes into fresh water aquifers.²⁶⁸

Injection wells can contaminate drinking water sources in three ways. First, they may discharge harmful wastes directly into and thereby contaminate potable water aquifers.²⁶⁹ Second, wastes may migrate in the ground water from disposal zones to potable water sources.²⁷⁰ Third, deep wells, improperly constructed or maintained, can allow leakage above the salt water table into fresh water aquifers.²⁷¹

C. Federal Jurisdiction Over Groundwater

Although there have been national standards for drinking water since 1914,²⁷² Congress enacted no comprehensive water pollution legislation until the Federal Water Pollution Control Act Amendments of 1972 (FWPCA).²⁷³ While the act expressly deals with groundwater in most of its titles,²⁷⁴ there is no mention of it in Title IV,²⁷⁵ the permit and license provision. Title IV contains the heart of

which is injected into a well to facilitate production of oil or gas, or water derived in association with oil or gas production and disposed of in a well
33 U.S.C. § 1362(6) (Supp. III 1979). The SDWA, however, does give the EPA authority to set minimum standards for those deep wells which could endanger drinking water supplies. 42 U.S.C. § 300h-1 (Supp. III 1979). See note 302 *infra*.

268. Tripp & Jaffe, *supra* note 262, at 7.

269. *Id.* at 6.

270. *Id.*

271. S. Krchma, Federal Jurisdiction over Ground Water Pollution 10 (Aug. 16, 1978) (unpublished L.L.M. thesis George Washington University).

272. Mr. Kyros, a principal sponsor of the SDWA, noted in a speech to the American Water Works Association in Boston on June 20, 1974 that there have been national drinking water standards since 1914. See 120 CONG. REC. 36, 370 (1974) (remarks of Rep. Rogers quoting Mr. Kyros).

273. 33 U.S.C. §§ 1251-1376 (1976), as amended by Clean Water Act of 1977, 33 U.S.C. §§ 1251-1376 (Supp. III 1979).

274. Title I concerns research and demonstration projects. 33 U.S.C. §§ 1251-65 (Supp. III 1979). For example, § 1254(a)(5) provides for EPA cooperation with states in equipping and maintaining system to monitor quality of navigable and ground waters.

Title II deals with grants for construction of waste treatment facilities. 33 U.S.C. §§ 1281-97 (Supp. III 1979). For example, § 1282(a)(4)(B) increases federal grants for treatment works where effluent treatment is needed to maintain groundwater supply.

Title III sets forth the parameters of standards and enforcement mechanisms. 33 U.S.C. §§ 1311-28 (Supp. II 1979). For example, § 1254(a)(1)(A) authorizes EPA to develop and publish water quality standards which may include groundwater quality.

275. 33 U.S.C. §§ 1341-45 (Supp. III 1979).

the act, the National Pollution Discharge Elimination System (NPDES).²⁷⁶ It is through the issuance of NPDES permits that the EPA regulates water pollution. Legislative history supports the conclusion that Congress intended to deny the EPA regulatory jurisdiction over groundwater pollution.²⁷⁷

To circumvent its lack of direct authority, the EPA attempted to assert what one might term pendant jurisdiction over groundwater pollution. Where EPA controlled an NPDES permittee's surface water discharges, the agency claimed the right to regulate any associated underground injection by that permittee.²⁷⁸ In *United States Steel Corp. v. Train*,²⁷⁹ the Seventh Circuit agreed. About a month later, however, the Fifth Circuit in *Exxon Corp. v. Train*²⁸⁰ rejected EPA's asserted authority. The *Exxon* court found that neither the legislative history²⁸¹ nor logic could support a claim of regulatory jurisdiction based on the "apparently fortuitous" use of two disposal methods by a single polluter.²⁸² Since the *Exxon* decision evidences better and more exhaustive reasoning than that in the *United States*

276. *Id.* § 1342. Section 1311(a) forbids any person to discharge any pollutant unless the polluter has received an NPDES permit in accordance with § 1342.

277. The Senate report states, for example,

Several bills before the Committee [on Public Works] provided authority to establish Federally approved standards for groundwaters Because the jurisdiction regarding groundwaters is so complex and varied from State to State, the Committee did not adopt the recommendation.

S. REP. NO. 414, 92d Cong., 1st Sess. 73, reprinted in A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972 II-1491 (1973) [hereinafter cited as FWPCA LEGIS. HIST.].

278. EPA General Counsel, Decision on Matter of Law Pursuant to 40 C.F.R. § 125.36(m) No. 6 (Apr. 8, 1975) reprinted in *Exxon Corp. v. Train*, 554 F.2d 1310, 1320 n.21 (5th Cir. 1977).

279. 556 F.2d 822 (7th Cir. 1977).

280. 554 F.2d 1310 (5th Cir. 1977).

281. *Id.* at 1325-31. The court was particularly impressed by the House debate over and defeat of Rep. Aspin's amendment. *Id.* at 1326-29. In introducing his amendment Representative Aspin said:

[T]he amendment brings ground water into . . . the enforcement of the bill. Ground water appears in this bill in every section, in every title except Title IV. It is under the title which provides EPA can study groundwater. It is under the title dealing with definitions. But when it comes to enforcement, Title IV, the section on permits and licenses, then ground water is suddenly missing. That is a glaring inconsistency which has no point.

Id. at 1328, quoting FWPCA LEGIS. HIST. I, *supra* note 277, at 589.

282. 554 F.2d at 1322.

Steel opinion, *Exxon* may carry greater precedential weight.²⁸³ Indeed congressional proponents of the Safe Drinking Water Act argued that their bill would give the EPA jurisdiction over underground injection which judicial interpretation of the FWPCA had denied.²⁸⁴

D. State and Local Initiatives

Both before and after Congress passed the SDWA, states regulated waste injection. This may explain judicial denial of authority allowing EPA to regulate injection.²⁸⁵ In 1961, Texas became the first state to regulate the underground injection of liquid wastes.²⁸⁶ Ohio became the second state in 1967.²⁸⁷ By 1971, 34 states enacted waste injection regulations.²⁸⁸ Before SDWA's enactment, Texas and Kansas, for example, already possessed regulatory programs fulfilling the requirements of the House bill, except where federal agencies con-

283. The EPA, noting the conflicting judicial opinions, admits that it has no express enforcement authority under the FWPCA and is turning to other acts, especially the SDWA, to find enforcement jurisdiction. See EPA, PROPOSED GROUND WATER STRATEGY II-11 (1980). [hereinafter cited as EPA STRATEGY].

284. See H.R. REP. NO. 1185, 93d Cong., 2d Sess., reprinted in [1974] U.S. CODE CONG. & AD. NEWS 6454.

285. See, e.g., *Exxon Corp. v. Train*, 554 F.2d 1310 (5th Cir. 1977) (Alabama required Exxon to receive permission for deep well injection from the Alabama Oil and Gas Board. The court stated its construction avoids "senseless bifurcation and conflicts" and is consistent with Congressional intent not to interfere with existing state groundwater controls); *United States v. GAF Corp.*, 389 F. Supp. 1379 (S.D.Tex. 1975) (prior to the court action, GAF had obtained a permit for the challenged disposal activity from the Texas Water Quality Board).

286. The 1961 Act is located at TEX. REV. CIV. STAT. ANN. art. 7621b (Vernon 1961). The current form is cited as the Disposal Well Act and is located at TEX. WATER CODE ANN. tit. 2, §§ 22.001-.104 (Vernon 1972).

287. See OHIO REV. CODE ANN. § 6111.043-.044 (Page 1977).

288. According to a questionnaire distributed by the Conference of State Sanitary Engineers, two states regulate only oilfield brine injection wells and four states (Georgia, Nevada, Tennessee and Wisconsin) do not allow waste injection well construction. Many states responding such as Florida, Delaware, Idaho, and Oregon, said they do not prohibit underground injection wells but state geologic conditions are not favorable to deep well injection. See D. WARNER, PUBLIC HEALTH SERVICE, U.S. DEP'T OF HEALTH, EDUCATION, AND WELFARE, DEEP WELL INJECTION OF LIQUID WASTE (1965), reprinted in *Water Pollution Control Legislation: Hearings on S.75 et al. Before the Subcomm. on Air and Water Pollution of the Senate Comm. on PUBLIC WORKS*, 92d Cong., 1st Sess., pt. 7, 335 (1971).

ducted deep well injection.²⁸⁹ Since the passage of the SDWA states have supplemented statutory definitions to include disposal by injection.²⁹⁰

In at least one instance a local community attempted to regulate underground injections. Iberville Parish in Louisiana passed an ordinance prohibiting the dumping, discharging, storage, injection, or other disposal of hazardous wastes within the parish.²⁹¹ When the operator of an injection well challenged the ordinance, the Louisiana Court of Appeals held that a comprehensive state hazardous waste control program had preempted the field.²⁹²

E. *The Safe Drinking Water Act (SDWA)*

After four years of deliberation,²⁹³ Congress enacted the SDWA to ensure a safe supply of public drinking water. The program covers 50,000 community water supplies serving year-round residents. It extended federal authority to over 200,000 non-community supplies which serve travelers and other intermittent users.²⁹⁴ In enacting the SDWA, Congress intended that the states will exercise primary responsibility for enforcement of the safe drinking water program.²⁹⁵ The EPA assumes primary enforcement responsibility only when a state submits no plan or the EPA disapproves the plan submitted.²⁹⁶

The SDWA's Underground Injection Control Program²⁹⁷ specifi-

289. See 120 CONG. REC. 36,380 (1974) (statement of Rep. Rogers reading letter from Russell E. Train).

290. See, e.g., KY. REV. STAT. § 224.005(8) (Supp. 1979); N.Y. ENVIR. CONSERV. LAWS § 27-0901(2) (McKinney Supp. 1979); OHIO REV. CODE ANN. § 3734.01(f) (Page 1980).

291. See *Rollins Env't'l Servs. of La. v. Iberville Parish Policy Jury*, 365 So.2d 497 (La. App. 1978).

The waste disposal facility operated a two mile deep injection well. According to a State Office of Conservation report, 39 companies used the well to dispose of everything from toluene waste to styrene. See Desmond, *Chemical Waste Haunts Louisiana Swamp*, Buffalo Courier-Express, reprinted in *Oversight—Resource Conservation and Recovery Act: Hearing before the Subcomm. on Oversight Investigations of the Comm. on Interstate and Foreign Commerce, House of Representatives*, 95th Cong., 2d Sess. 18 (1978) [hereinafter cited as *RCRA Oversight*].

292. *Id.*

293. See 120 CONG. REC. 37,579 (1974) (remarks of Sen. Hart).

294. See *SDWA Oversight*, *supra* note 249, at 5 (statement of Thomas C. Jorling).

295. See *SDWA Oversight*, *supra* note 249, at 3 (statement of Thomas C. Jorling).

296. *Id.*

297. 42 U.S.C. §§ 300h-300h-3(d) (Supp. III 1979).

cally requires the protection of existing or potential underground sources of drinking water.²⁹⁸ The Act orders the EPA Administrator to list states needing a deep well injection program.²⁹⁹ The EPA must also promulgate the minimum requirements for state underground injection control programs.³⁰⁰ Given the Act's limited focus, however, EPA jurisdiction does not extend to underground injection which may cause ecological harm but poses no direct threat to drinking water sources.³⁰¹

EPA's first set of proposed Underground Injection Control (UIC) regulations appeared in the Federal Register on August 31, 1976.³⁰² Pursuant to extensive public comment, EPA withdrew the proposed regulations for substantial revision.³⁰³ Oil and gas deep well injection and shallow well regulation were the major areas requiring revision.³⁰⁴ Two years after publication of the first proposed regulations, concerned groups questioned the absence of the revisions. Although

298. See H.R. REP. NO. 1185, 93d Cong., 2d Sess., reprinted in [1974] U.S. CODE CONG. & AD. NEWS 6484 (referring to § 300h(d)). See also SDWA OVERSIGHT, *supra* note 229, at 5 (statement of Thomas C. Jorling).

299. See 42 U.S.C. § 300h-1(a) (1976).

300. See 42 U.S.C. § 300h(a)-(b) (1976).

301. See EPA STRATEGY, *supra* note 283, at III-11. See generally Wheatley & Castaneda, *Protection of Underground Drinking Water Supplies—the Gonzales Amendment to the Safe Drinking Water Act*, 8 ST. MARY'S L.J. 40 (1976).

The extent of the EPA regulatory jurisdiction over well injection depends on the endangerment of a drinking water source. 42 U.S.C. § 300h(b) (1976). Fortunately the statute defines "endanger" and "drinking water source" broadly:

Underground injection *endangers* drinking water sources if such injection *may* result in the presence in underground water which . . . *can reasonably be expected* to supply any public water system of any contaminant, and if the presence of such contaminant *may* result in such systems not complying with any national primary drinking water regulation or *may otherwise adversely affect* the health of persons.

42 U.S.C. § 300h(d)(2) (1976) (emphasis added).

An underground drinking water source (UDWS) is defined as an aquifer which supplies water for human consumption or contains less than 10,000 ppm of dissolved solids. 40 C.F.R. § 146.4 (1980). Congress recommended the inclusion of the dissolved solid provision to protect potential future drinking water sources. See [1974] U.S. CONG. & AD. NEWS 6484.

302. See Fed. Reg. 36,730 (1976).

303. See SDWA Oversight, *supra* note 249, at 8 (statement of Thomas C. Jorling).

304. EPA designed the oil and gas revisions to provide maximum environmental benefit without unreasonable hinderances on fossil fuel production or unreasonable costs. The goal with regard to shallow wells was to provide necessary protection without creating unnecessary economic disruption. *Id.* See also 120 CONG. REC. 37,591 (1974) (remarks of Sen. Hart).

the EPA blamed the delay on a lack of funds,³⁰⁵ some EPA officials explained that the agency was waiting for the public's emotional reaction to Love Canal and similar occurrences to subside.³⁰⁶ At one point, several environmental groups sued EPA for failure to issue the regulations.³⁰⁷ EPA finally resubmitted the regulations in June 1979,³⁰⁸ and published the final copy in the Federal Register on May 19, 1980.³⁰⁹ All regulations for UIC permits and programs took effect on July 18, 1980.³¹⁰

The regulations are complex, consolidating regulations for five programs under four statutes.³¹¹ The regulations govern three EPA-administered permit programs: the UIC program,³¹² the National Pollutant Discharge Elimination System (NPDES),³¹³ and the Hazardous Waste Permit Program (under the Resource Conservation and Recovery Act (RCRA)).³¹⁴ EPA plans an extensive public education program designed to make the regulations less confusing and easier to use. One part of the program involves distributing reprints containing only the parts of the consolidated regulations which are applicable to each individual regulatory area. Another facet of the program calls for booklets addressed to individual constituencies,

305. See Lynch, *EPA Unit Admits It's Unable to Fix Sites*, Buffalo Courier-Express, reprinted in *RCRA Oversight*, supra note 291, at 32; Editorial, *Get Busy on Waste Cleanup*, Buffalo Courier-Express, reprinted in *RCRA Oversight*, supra note 291, at 46.

306. See *Rules on Wastes Due in 1980*, Buffalo Courier-Express, reprinted in *RCRA Oversight*, supra note 291, at 46. Many residents of New Orleans, for example, do not trust the local water supply since twenty carcinogenic chemicals were found in their drinking water. The cost to those who buy bottled water or home water treatment devices is higher than are rate increases required by Safe Drinking Water Regulations. See Desmond, *Chemical Waste Haunts Louisiana Swamp*, Buffalo Courier-Express, reprinted in *RCRA Oversight*, supra note 291, at 25.

307. The suit was settled under a consent decree. See Desmond, *EPA Slow In Flighting Waste Peril*, Buffalo Courier-Express, reprinted in *RCRA Oversight*, supra note 291, at 15.

308. See 44 Fed. Reg. 34,393 (1979).

309. See 45 Fed. Reg. 33,290 (1980).

310. *Id.*

311. EPA acknowledges that the consolidated regulations are complex but believes that one set is less complex than five would have been. See 45 Fe. Reg. 33,292 (1980).

Section 122.1 explains the permit programs which are included in the consolidated regulations. 44 Fed. Reg. 33,418 (1980).

312. See 45 Fed. Reg. 33,436 (1980).

313. See 45 Fed. Reg. 33,441 (1980).

314. See 45 Fed. Reg. 33,432 (1980).

such as farmers, or permit applicants.³¹⁵

Provisions specific to the UIC program are spread throughout the consolidated regulations. Part 122 pertains to permit requirements;³¹⁶ part 123 lists minimum state program requirements;³¹⁷ and part 124 gives procedures for decision making.³¹⁸ Part 122 further separates into subparts A-D. Subpart A defines the terms EPA uses in the regulations³¹⁹ and gives basic program requirements, including application requirements,³²⁰ standard permit conditions,³²¹ and grounds for modification and termination of permits.³²² Subparts B-D also contain requirements imposed under the FWPCA and RCRA.³²³

The consolidated permit forms under Subpart A will be helpful for permit applicants.³²⁴ Permit program directors must issue the permits in a manner consistent with other federal laws such as the Wild and Scenic Rivers Act and the Endangered Species Act.³²⁵ Permit applicants must provide detailed information, including a topographic or other map of the area surrounding the facility showing various parts of the facility's physical operation and the geographic character of the area.³²⁶ Although a permittee may claim that some required permit information is confidential business information, the regulations do not allow any confidentiality claim for UIC permittees with regard to information about the existence or level of contaminant in drinking water.³²⁷ Each permit-issuing authority, whether

315. See 45 Fed. Reg. 33,293-94 (1980).

316. See 40 C.F.R. §§ 122.1-66 (1981).

317. See 40 C.F.R. §§ 123.1-137 (1981).

318. See 40 C.F.R. §§ 124.1-128 (1981).

319. See 40 C.F.R. §§ 122.3 (1981).

320. See 40 C.F.R. §§ 122.4 (1981).

321. See 40 C.F.R. §§ 122.7 (1981).

322. See 40 C.F.R. §§ 122.15-16 (1981).

323. Subpart B contains the RCRA hazardous waste permit program requirements. 40 C.F.R. §§ 122.21-30 (1981). Subpart C refers to the UIC program. 40 C.F.R. §§ 122.31-45. Subpart D contains additional elements for the NPDES programs under the FWPCA. 40 C.F.R. §§ 122.51-66 (1981).

324. EPA expects the consolidated permit application forms to be especially helpful for the RCRA hazardous waste and UIC permit applicants. EPA encourages the states to take a similar approach. See 45 Fed. Reg. 33,291 (1980).

325. 40 C.F.R. § 122.12 (1981).

326. 40 C.F.R. § 122.7(d) (1981) (the map requirement is in § 122.7(d)(7)).

327. 40 C.F.R. § 122.19 (1981).

the state or the EPA, must prepare quarterly and annual reports. These reports must contain information about non-compliance by permit holders and actions taken by the permit issuer to ensure compliance.³²⁸

Subpart C contains the specific requirements of the UIC program.³²⁹ Since the EPA Administrator has determined that every state contain underground drinking water sources which require protection from underground waste injection.³³⁰ All states must submit a UIC program to the EPA.³³¹ Once a state establishes a program, all well injections into designated aquifers are unlawful unless authorized by a permit or a rule.³³² Subpart C regulations set the minimum requirements for injection authorization by permit or rule. They also prohibit, without exception, certain types of injection.³³³

UIC regulations regulate the following types of injections: injection wells on drilling platforms inside state territorial waters; holes or wells dug deeper than their surface dimensions when the principal function of the excavation is emplacement of fluids; and septic tanks or cesspools used for cheap hazardous waste disposal by an industry, community system or multiple dwelling.³³⁴ The regulations specifically do not cover injection wells on drilling platforms beyond state territorial waters; individual or single family waste disposal systems; and wells or holes not used for emplacement of fluids in the ground.³³⁵ The UIC program defines five classes of injection wells.³³⁶ The criteria which determine the classes of wells are: the operator of the injection well, the type of substance being injected,

328. 40 C.F.R. § 122.18 (1981).

329. 40 C.F.R. § 122.31-45 (1981).

330. The SDWA requires the EPA Administrator to list each state where an underground injection control program may be necessary. 42 U.S.C. § 300h-1(a) (1976). See also 40 C.F.R. § 122.31(b)(2) (1981).

The House of Representatives anticipated that the Administrator would list all 50 states, but possibly not include the District of Columbia, territories, and possessions. See H.R. REP. No. 1185, 93 Cong., 2d Sess. reprinted in [1974] U.S. CODE CONG. & AD. NEWS 6485.

331. All states must submit a UIC program within 270 days after the effective date of the regulations. The EPA Administrator may, however, grant an extension. See 40 C.F.R. § 122.31(c) (1981).

332. *Id.*

333. See 40 C.F.R. § 122.31(d) (1981).

334. See 40 C.F.R. § 122.31(d)(1) (1981).

335. See 40 C.F.R. § 122.31(d)(2) (1981).

336. See 40 C.F.R. § 122.32 (1981).

and the proximity of the well to an underground source of drinking water.³³⁷ The regulations further provide for the identification of underground sources of drinking water and exempted aquifers.³³⁸ Other provisions explain rule and permit authorization.³³⁹ Under certain circumstances, the director of a UIC program may issue emergency permits.³⁴⁰ The regulations also promulgate guidelines on requirements for construction, operation, monitoring and reporting, plugging and abandonment, financial responsibility, and mechanical integrity.³⁴¹ The director of a UIC program sometimes may authorize an injection well with less stringent conditions attached to the permit.³⁴² The UIC program also includes a special section exclusively for wells that inject hazardous wastes.³⁴³

F. Conclusion

The promulgation of the UIC program regulations is a promising step toward control of underground water contamination. These reg-

337. *Id.*

338. See 40 C.F.R. § 122.35 (1981).

An underground source of drinking water is "an aquifer or its portion: (a)(1) which supplies drinking water for human consumption; or (2) in which the groundwater contains fewer than 10,000 mg/l 'total dissolved solids,' and (b) which is not an 'exempted aquifer.'" 40 C.F.R. § 122.3 (1981).

The first four sites EPA designated as sole source aquifers were the Edwards Aquifer in San Antonio, Texas, the Island of Guam, Spokane, Washington, and Nassau and Suffolk Counties on Long Island, New York. See *SDWA Oversight*, *supra* note 249, at 80 (statement by Thomas C. Jorling). See also Review of Projects Affecting the Edwards Underground Reservoir, a Designated Sole Source Aquifer in the San Antonio, Texas Area located at 40 C.F.R. §§ 149.1-19 (1981).

339. See 45 Fed. Reg. 33,438 (1980) (to be codified at 40 C.F.R. §§ 122.37-38 (1981)).

340. The director may temporarily allow an underground injection not covered by an existing permit or rule if the health of persons will be endangered otherwise or if "a substantial and irretrievable loss of oil or gas resources" will result. The regulations impose further limiting requirements on emergency permits to prevent loss of oil or gas. 40 C.F.R. § 122.40 (1981).

341. See 40 C.F.R. § 122.42(a)-(i) (1981) (these conditions are in addition to requirements set out in 40 C.F.R. 122.8(a)).

342. A director may waive requirements

"when injection does not occur into, through, or above an underground source of drinking water, . . . [or] [w]hen injection occurs into, through or above an underground source of drinking water, but the radius of endangering influence when computed under § 146.06(c) is a negative number . . ."

49 C.F.R. § 122.43 (1981).

343. See 40 C.F.R. § 122.45 (1981).

ulations allow EPA broad authority to regulate well injection practices.³⁴⁴ Although many states have undertaken to regulate underground waste disposal, there is a wide variation in the extent and effectiveness of their efforts.³⁴⁵ While the UIC regulations set minimum requirements for all the states to meet, the states may choose to exercise stricter control over the underground disposal of wastes in their states. Furthermore the consolidated permit application procedures will allow applicants to apply more easily for permits under the UIC program and the other included programs in jurisdictions where the EPA Administrator has primary responsibility. Hopefully, once states assume primary responsibility for their own programs they will also adopt the theory of consolidated permit applications.

In addition, signs of a wider recognition of the hazardous effects of deep well injection on groundwater are encouraging. The company that pioneered deep well injection as a waste disposal method has stopped drilling new wells.³⁴⁶ A governor who once told environmentalists he wasn't interested in pollution declared a moratorium on new hazardous waste permits.³⁴⁷

The advancements made by the enactment of the SDWA, the promulgation of the UIC program regulations, and the efforts of individual states to regulate well injection must continue.

IV. RECENT DEVELOPMENTS IN SEWAGE

TREATMENT SARAH SIEGEL

A. *Introduction*

Concern for the quality of our nation's waters led Congress to enact amendments to the Federal Water Pollution Control Act

344. See *SDWA Oversight*, *supra* note 249, at 30 (statement of Jacqueline M. Warren).

345. See notes 285-92 and accompanying text *supra*.

346. Dow Chemical pioneered the use of individual deep injection wells, but has now discontinued drilling new wells and is phasing out existing wells. See H.R. REP. No. 1185, 93d Cong., 2d Sess., *reprinted in* [1974] U.S. CODE CONG. & AD. NEWS 6481.

347. Louisiana Governor Edwin Edwards declared a moratorium on new hazardous waste permits five years after he told environmentalists he was not interested in their concerns. See Desmond, *Chemical Waste Haunts Louisiana Swamp*, Buffalo Courier-Express, *reprinted in RCRA Oversight*, *supra* note 291, at 24.