Pace Environmental Law Review

Volume 11
Issue 2 *Spring 1994*

Article 3

April 1994

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PACE ENVIRONMENTAL LAW REVIEW

Volume 11 Spring 1994 Number 2

State Liability Under CERCLA for Low-Level Radioactive Waste Disposal: Preparing for the Inevitable

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In this article the author examines the special role of the states in the low-level radioactive waste disposal crisis presently plaguing the United States and the resulting potential for state liability under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). In doing so, the author will suggest some possible ways by which states may limit their CERCLA liability while satisfying their waste disposal responsibilities to their citizens and the environment.

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I. Introduction

More than a decade ago, the Low-Level Radioactive Waste Policy Act of 1980 (LLRWPA)[1] conferred on the states full responsibility for the disposal of most low-level radioactive waste (LLRW) generated within their respective borders.[2] As a result, states now play a predominant role in all phases of LLRW disposal, from site selection, development and operation through post-closure long-term maintenance.[3] To most effectively accomplish safe LLRW disposal, the

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1. Pub. L. No. 96-573, 94 Stat. 3348 (current version in scattered sections of 42 U.S.C.). The term "LLRWPA" as used herein refers to the statute as originally enacted and as amended by the Low-Level Radioactive Waste Policy Amendments Act (LLRWPAA). Pub. L. No. 99-240, 99 Stat. 1842 (1985) (codified as amended at 42 U.S.C. §§ 2021b-2021j (1988)).

2. States are not required to provide disposal capacity for nonfederal LLRW or for the most hazardous and long-lived type of LLRW. The LLRWPA assigns to the federal government responsibility for the disposal of LLRW that is:

> (A) . . . owned or generated by the Department of Energy;
> (B) . . . owned or generated by the United States Navy as a result of the decommissioning of vessels . . . ;
> (C) . . . owned or generated by the Federal Government as a result of any research, development, testing, or production of any atomic weapon; and
> (D) any other low-level radioactive waste with concentrations of radionuclides that exceed the limits . . . for class C radioactive waste . . . .

42 U.S.C. § 2021c(b)(1) (1988). *See infra* note 11 for a discussion of the classes of LLRW as established by the Nuclear Regulatory Commission (NRC).

3. *See infra* Part IV.

LLRWPA encourages states to form regional interstate compacts, and to develop new LLRW disposal facilities by specified deadlines.[4] The last deadline is rapidly approaching in 1996, when a state which cannot provide for disposal of its LLRW must assume title to, possession of, and liability for the waste.[5]

The same year in which the LLRWPA was passed, Congress enacted the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA),[6] in an effort to remedy the proliferation of abandoned property contaminated with hazardous substances.[7] CERCLA imposes strict liability upon certain parties for releases from hazardous waste facilities.[8] The LLRWPA is silent as to the application of CERCLA to states for their involvement with LLRW, and CERCLA itself is unclear as to the extent to which states will be liable for environmental damage at LLRW disposal sites.[9]

States currently face significant pressure to develop new LLRW disposal sites in accordance with the LLRWPA.[10] As

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4. *See* 42 U.S.C. §§ 2021d, 2021e (1988). *See infra* text accompanying notes 35-44.

5. The LLRWPAA mandates that:

> If a State (or, where applicable, a compact region) in which low-level radioactive waste is generated is unable to provide for the disposal of all such waste generated within such State or compact region by January 1, 1996, each State in which such waste is generated, upon the request of the generator or owner of the waste, shall take title to the waste, be obligated to take possession of the waste, and shall be liable for all damages directly or indirectly incurred by such generator or owner as a consequence of the failure of the State to take possession of the waste as soon after January 1, 1996, as the generator or owner notifies the State that the waste is available for shipment.

42 U.S.C. § 2021e(d)(2)(C) (1988). This provision has been held to be unconstitutional as it applies to noncompact states, and its status as to compact states remains uncertain. *See infra* note 43.

6. Pub. L. No. 96-510, 94 Stat. 2767 (1980) (current version 42 U.S.C. §§ 9601-9675 (1988)).

7. H.R. REP. No. 96-1016, 96 Cong., 2d Sess. (1980), *reprinted in* 1989 U.S.C.C.A.N. 6119-20.

8. 42 U.S.C. § 9607(a) (1988). *See also infra* notes 96, 98 and accompanying text.

9. *See infra* Part V. B.

10. *See infra* notes 36-47 and accompanying text.

part of the site development process, states must fully assess their potential liability under CERCLA for sites located within their borders or compact regions. Only after this potential liability has been evaluated and means adopted to assure site cleanup in the event of a radioactive release without undue taxpayer burden, will states be motivated and fully prepared to implement the provisions of the LLRWPA.

The purpose of this article is to examine the potential for state liability under CERCLA, resulting from state involvement at LLRW disposal sites, and to suggest mechanisms whereby states may limit their CERCLA liability, as well as insure the availability of environmental liability funds throughout the entire life of the LLRW site. Part II provides background information regarding the nature, source and disposal of LLRW. Part III discusses the LLRWPA and its 1985 amendments. Part IV discusses federal, state and compact requirements for state involvement in the development, operation and maintenance of LLRW sites. Part V examines relevant provisions of CERCLA and analyzes their application to states as potentially responsible parties for contaminated LLRW sites. Part VI suggests statutory, contractual and financial arrangements by which states may face CERCLA liability without undue taxpayer burden, allocate liability among other responsible parties such as LLRW generators and private site operators, and ensure the long-term availability of cleanup funds. This article concludes that although states inevitably will assume CERCLA liability for radioactive releases from LLRW disposal sites, there do exist protective measures to limit and guarantee payment of their liability.

II. Background: The Nature, Source and Disposal of LLRW

Low-level radioactive waste generally refers to material containing "low but potentially hazardous concentrations of radionuclides,"[11] which remains radioactive for hundreds of

11. Senator Gary W. Hart & Keith R. Glaser, *A Failure to Enact: A Review of Radioactive Waste Issues and Legislation Considered by the Ninety-Sixth*

years.[12] Although in some forms LLRW requires little or no shielding[13] and has been described as a "relatively benign

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Congress, 32 S.C. L. REV. 639, 650 (1981). For purposes of this article, LLRW refers to radioactive waste which the states must dispose of under the LLRWPA, which defines LLRW as radioactive material that "is not high-level radioactive waste, spent nuclear fuel, or byproduct material" and that the Nuclear Regulatory Commission (NRC) classifies as low-level radioactive waste. 42 U.S.C. § 2021b(9) (1988).

The NRC categorizes LLRW into Class A, B, or C by its concentration, energy level, half-life, and source. Jorge Contreras, *In the Village Square: Risk Misperception and Decisionmaking in the Regulation of Low-Level Radioactive Waste*, 19 ECOLOGY L.Q. 481, 489 n.33 (1992). Each class must meet increasingly rigorous stability requirements for disposal. *See* 10 C.F.R. § 61.55(a)(2) (1992).

Class A waste is considered relatively innocuous but unstable, and must be segregated from other waste classes for disposal. If the Class A waste is stable, however, it may be mixed with other classes for disposal. 10 C.F.R. § 61.55(a)(2) (1992). Class B waste will decay within 100 years to a level such that it will not present an unacceptable hazard to a site intruder. 10 C.F.R. § 61.7(b)(4) (1992). Class C waste will not decay to acceptable levels within 100 years, and must be disposed of at greater depths than Class A or B waste. Where deeper disposal is not possible, intruder barriers that have a life of 500 years may be used as an alternative protective measure. 10 C.F.R. § 61.7(b)(5) (1992).

The federal government is responsible for disposal of all LLRW greater than Class C, which will not decay to acceptable levels within 500 years. 42 U.S.C. § 2021c(b)(1) (1988). These wastes are generally unacceptable for near-surface disposal and may require disposal in a geologic repository. 10 C.F.R. § 61.55(a)(2)(iv) (1992). This fourth category is called "Greater than Class C Waste" or "GTCC." Contreras, *supra*, at 489 n.33.

12. Dean Hansell, *The Regulation of Low-Level Nuclear Waste*, 15 TULSA L.J. 249 (1979). In comparison, high-level radioactive waste, which differs from LLRW in its concentration of radioactivity, is long-lived, highly toxic and, because of its intense and persistent levels of radioactivity and heat, must be isolated for thousands of years. Joseph R. Prochaska, *Low-Level Radioactive Waste Disposal Compacts*, 5 VA. J. NAT. RESOURCES L. 383, 384 (1986). High-level radioactive waste consists of unreprocessed spent fuel rods and the liquid that results from the reprocessing of spent nuclear fuel. Tim L. Peckinpaugh, *An Analysis of Regional Interstate Compacts for the Disposal of Low-Level Radioactive Wastes*, 5 J. ENERGY L. & POL'Y 21, 22 (1983).

13. The type of radiation emitted by LLRW is typically beta or gamma radiation. Contreras, *supra*, note 11 at 485. Beta radiation can be stopped by a layer of clothing or a thin plastic or glass shield. *Id.* Gamma radiation, however, may require several feet of concrete or several inches of lead to be 90% shielded. *Id.* LLRW also may emit alpha radiation. Charles H. Montange, *Federal Nuclear Waste Disposal Policy*, 27 NAT. RESOURCES J. 309, 362 (1987); *see* 10 C.F.R. § 61.55 (1992).

form of radioactive residue,"[14] its disposal poses "serious environmental and safety problems."[15]

Low-level waste may be in solid, liquid or gaseous form, and is generated from a variety of sources.[16] The majority of LLRW is produced by nuclear power plants in the form of "spent resins and filters, solidified sludge, activated plant components and control rods, and contaminated trash, tools"[17] and supplies such as gloves and protective clothing.[18] The next largest generators of LLRW are industrial facilities, which produce radioactive chemicals for agricultural, environmental, pharmaceutical and biomedical uses; materials for nuclear power generation; and consumer products such as smoke detectors, enamel glazes, fabrics, illuminated signs, luminous watch dials, and measurement devices.[19] Academic and medical institutions contribute a much smaller volume of LLRW in the form of contaminated laboratory equipment and animal carcasses, sealed radioactive sources used in cancer therapy, and solidified liquids.[20] Finally, a relatively small amount of LLRW is produced by government activities, in-

14. Peckinpaugh, *supra* note 12, at 21.

15. Prochaska, *supra* note 12, at 384.

16. Hart & Glaser, *supra* note 11, at 655.

17. E. William Colglazier & Mary R. English, *Low-Level Radioactive Waste: Can New Disposal Sites Be Found*, 53 TENN. L. REV. 621, 626 (1986). *See also* Dan M. Berkovitz, *Waste Wars: Did Congress "Nuke" State Sovereignty in the Low-Level Radioactive Waste Policy Amendments Act of 1985?*, 11 HARV. ENVTL. L. REV. 437, 440 (1987).

18. Contreras, *supra* note 11, at 486. It has been estimated that commercial nuclear power reactors account for 54%-64% of the country's LLRW. Berkovitz, *supra* note 17, at 440; Colglazier & English, *supra* note 17, at 626; Katherine R. Shanabrook, *Low-Level Radioactive Waste Disposal Facility Sitings: Negotiating a Role for the Public*, 3 OHIO ST. J. ON DISP. RESOL. 219, 222 n.16 (1987). A future significant source of LLRW will be the decommissioning of nuclear power plants when they exhaust their useful lives of forty years. Contreras, *supra* note 11, at 486.

19. Contreras, *supra* note 11, at 486. Industry contributes approximately 29% of the total LLRW volume. Colglazier & English, *supra* note 17, at 626.

20. Colglazier & English, *supra* note 17, at 627. Universities and hospitals which use radioactive materials for diagnosis, research and treatment contribute approximately 3% of the total LLRW volume. *Id.* Over 100,000,000 medical procedures using radioactive materials are conducted in the United States each year. The most common procedures are diagnostic radiology, radioimmunoassays, and radiotherapy. Contreras, *supra* note 11, at 487.

cluding waste generated by the Department of Agriculture, remedial cleanup programs, nuclear-powered naval vessels, military hospitals, and research centers.[21]

In the United States, since the 1940's, a predominant technique for LLRW disposal has been "shallow land burial" (SLB).[22] Despite new safety requirements issued by the NRC, however, SLB is disfavored as a disposal method for all classes of LLRW, and is expressly banned for commercial LLRW disposal in eighty percent of the states and regional compacts.[23] Alternative disposal methods favored by the NRC are below-ground vaults and earth-mounded concrete bunkers.[24] Other alternatives include above-ground vaults,

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21. Contreras, *supra* note 11, at 486-87. Government LLRW comprises approximately 2% of the total national LLRW volume. Colglazier & English, *supra* note 17, at 627. This figure does not include LLRW generated by federal nuclear weapons plants and energy research facilities, which is stored on federally owned, operated and regulated sites. Contreras, *supra* note 11, at 486. This waste is not within the scope of the LLRWPA, and thus is not discussed in this article.

22. Shanabrook, *supra* note 18, at 225. Until the mid-1960's, radioactive waste also was disposed of by ocean dumping. This was gradually phased out, and the last sea disposal occurred in 1970. Hansell, *supra* note 12, at 257.

SLB involves depositing waste containers in trenches 20-60 feet wide, 20-40 feet deep, and several hundred feet long. The filled trench is capped with a layer of soil 3-10 feet thick. Contreras, *supra* note 11, at 490. An "improved SLB" technology employed at operating LLRW disposal facilities requires segregation of Class A, B, and C waste and stabilization of Class B and C waste with an agent such as cement or packaging it in a "high-integrity container." *Id.* This method is currently used at the LLRW facilities at Beatty, Nevada, Barnwell, South Carolina, and Hanford (Richland), Washington. *Id.*

23. Contreras, *supra* note 11, at 490. *See, e.g.*, ILL. ANN. STAT. ch. 111-1/2, para. 241-8(e) (Smith-Hurd Supp. 1992); NEB. REV. STAT. § 81-15,101.02 (1987); TEX. HEALTH & SAFETY CODE ANN. §§ 402.225-.226 (West 1992). In fact, the LLRWPA requires the NRC to identify methods other than SLB for LLRW disposal and to publish technical guidance for the licensing of such facilities. 42 U.S.C. § 2021h (1988).

For a different point of view on the adequacy of SLB for LLRW disposal, *see* Peckinpaugh, *supra* note 12, at 23 (stating that because LLRW disposal should not pose any substantial environmental threat and only minimal public health risk, shallow land burial is adequate for safe LLRW disposal). A NRC Draft Environmental Impact Statement, prepared in 1981, concluded that "over long periods of time (up to 1,000 years) the maximum permissible releases of radiation resulting from shallow burial of LL[R]W would be extremely low and the threat to the health and safety of the public would be trivial." *Id.*

24. Berkovitz, *supra* note 17, at 457 n.86. A below-ground vault is an enclosed structure below the surface of the earth. In contrast, an earth-mounded

earth or clay-covered concrete pads, deep geologic repositories, or mined cavities.[25] Only the alternative disposal method of earth or clay-covered concrete pads ("tumulus") has been tried in the United States.[26]

III. The LLRWPA and LLRW Disposal Dilemma

Prior to 1954, the federal government maintained exclusive control over the disposal of LLRW.[27] As the generation of radioactive waste rapidly increased, Congress ceded to the states limited authority over radioactive waste disposal.[28] As

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concrete bunker may include trenches, below-ground vaults and earth mounds. France uses this method to embed high-level wastes in concrete below ground and then to bury LLRW above ground in earthen mounds. *Id.*; Contreras, *supra* note 11, at 490.

25. Contreras, *supra* note 11, at 490.

26. *Id.* Several European countries have expended more money than has the United States in their use of alternative methods to SLB which are considered safer. Germany, Switzerland, and Sweden bury LLRW in closed structures deep in the ground or below the seabed. Anna H. Waendelin, Book Note, 8 UCLA J. ENVTL. L. & POL'Y 105, 116 (1988) (reviewing *Low-Level Radioactive Waste Regulation: Science, Politics and Fear* (Michael E. Burns ed., 1988)). Sweden is currently constructing a rock cavern repository for LLRW disposal, a method which also has been proposed in Switzerland. In the Netherlands, LLRW is presently stored above-ground pending the construction of a permanent above-ground facility. Contreras, *supra* note 11, at 490 n.49. Likewise, England is considering construction of a deep disposal facility, although it currently disposes LLRW in landfills. *Id.*

On the other hand, Spain and Belgium are planning SLB disposal sites, and France still uses SLB for some of its LLRW. *Id.*; *but see supra* note 24.

27. *See* Contreras, *supra* note 11, at 509-10. The Atomic Energy Act (AEA), 42 U.S.C. §§ 2011-2296, passed in 1946, gave sole responsibility for all United States nuclear energy activities to the Atomic Energy Commission (AEC). Because most of this activity related to the Manhattan Project and other military purposes, radioactive waste was stored at government facilities. Contreras, *supra* note 11, at 509-10. In 1954, the AEA was amended to give the AEC authority over civilian atomic energy activities. Two government facilities in Kentucky and Idaho handled the disposal of both commercial and government LLRW. *Id.* at 510.

28. In 1959, the AEA was amended again to allow states to control the disposal of non-military radioactive waste within their borders if they met minimum federal standards. *Id.* However, the AEC was not prepared at that time to give states full authority over LLRW disposal, reasoning that states were not qualified to manage LLRW and federal control would be most efficient. *Id.*

Despite subsequent criticism of the federal government's handling of its own LLRW, *see* Contreras, *supra* note 11, at 511 n.186, and the eventual passage of a statutory scheme officially placing LLRW disposal in state hands, the

a result of pressure from states and private industry, the Atomic Energy Commission (AEC) eventually allowed private firms to acquire licenses for LLRW disposal sites on federal or state-owned land.[29] States controlled civilian power, research and medical LLRW, and the federal government handled only its own radioactive waste.[30] Within ten years, there were six commercial LLRW disposal facilities in operation.[31]

Due to safety concerns and storage capacity problems, five of the sites were closed by 1979.[32] When the burden of handling eighty percent of all LLRW disposal for the entire nation fell on the remaining site in Barnwell, S.C., the governor of South Carolina announced that the state would reduce by fifty percent the amount of waste it would accept.[33] This crisis in LLRW disposal led to intensive state lobbying for legislation delegating control over LLRW facilities to the states.[34]

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debate continues as to whether state or federal entities are more qualified to effectively and safely manage LLRW disposal. *See infra* note 153.

29. Myra Clark Lynch, Case Note, *State Control of Low Level Nuclear Waste Disposal*, 17 NAT. RESOURCES J. 683, 685 (1977).

30. Contreras, *supra* note 11, at 511.

31. These sites were located at Beatty, Nevada; Maxey Flats, Kentucky; West Valley, New York; Hanford (Richland), Washington; Sheffield, Illinois; and Barnwell, South Carolina. Contreras, *supra* note 11, at 511 & n.187. All of these sites except Hanford (Richland) were owned by the states and operated by private companies. *Id.* at 511. The Hanford (Richland) site is owned by the federal government, leased to the state, and subleased to a private LLRW disposal facility operator. Washington State Bldg. & Const. Trades Council v. Spellman, 684 F.2d 627, 629 (9th Cir. 1982). The Beatty site was licensed by the host states under agreement state arrangements with the AEC. Lynch, *supra* note 29, at 685. *See infra* note 59 for a discussion of agreement state status.

32. The Maxey Flats and West Valley sites were closed due to groundwater contamination. The Sheffield site ran out of storage capacity. Contreras, *supra* note 11, at 511-12. Hanford (Richland) was closed temporarily following the receipt of three defective LLRW shipments. *Id.* at 512 & n.194. The Beatty site was closed following two serious incidents involving radioactive releases. *Id.* at 512 & n.195. *See infra* note 102.

33. Contreras, *supra* note 11, at 512.

34. *Id.* at 512-16. Several state organizations acted quickly and effectively to unite in pressuring Congress and the Carter administration to adopt a national policy of state and regional control over LLRW disposal. The National Governors' Association, the State Planning Council on Radioactive Waste Management, and the National Conference of State Legislatures submitted recom-

As a result, in 1980, Congress attempted to resolve the lack of sufficient and equitably distributed disposal sites by enacting the LLRWPA.[35] The LLRWPA reflected two federal policies: (1) the states are responsible for disposal of LLRW generated within their borders; and (2) disposal will most safely and efficiently be accomplished on a regional basis.[36] To accomplish these policies, the LLRWPA authorized states to enter into compacts to establish and operate regional LLRW disposal facilities.[37] To encourage the formation of compacts, states were given a deadline of January 1, 1986, to develop disposal facilities. After that date, any regional compact could bar waste from states outside the region.[38]

Within a few years of the passage of the LLRWPA it became clear that most states would be unable to comply with the 1986 deadline.[39] Thus, in 1985, to provide continued access to extant disposal facilities and to encourage site development, Congress passed the Low-Level Radioactive Waste Policy Amendments Act (LLRWPAA).[40]

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mendations in this regard to Congress and President Carter. Berkovitz, *supra* note 17, at 443-44.

35. L. David Condon, *The Never Ending Story: Low-Level Waste and the Exclusionary Authority of Noncompacting States*, 30 NAT. RESOURCES J. 65, 68-69 (1990). For an interesting discussion of the debates on issues of states' rights and interstate parity which arose in the political fight over how to solve the LLRW disposal problem, see Contreras, *supra* note 11, at 512-19.

36. 42 U.S.C. § 2021d(a)(1) (1988); *see* Condon, *supra* note 35, at 69.

37. 42 U.S.C. § 2021d(a)(2) (1988). Interstate compacts are contracts between two or more states which have the force of law. Peckinpaugh, *supra* note 12, at 31. To become effective, the compact must be ratified by each member state and by the United States Congress. 42 U.S.C. § 2021d (1988). Upon congressional consent, the compact becomes enforceable federal law, which supersedes even state constitutional provisions. Peckinpaugh, *supra* note 12, at 32-33.

38. 42 U.S.C. § 2021d(a)(1) (1988).

39. Berkovitz, *supra* note 17, at 445. The states did not form regional compacts as quickly as expected, and they broke into numerous small regional groups rather than the anticipated six to eight large regional compacts. Prochaska, *supra* note 12, at 386. By 1985, 37 states had entered into nine compacts, with four more in negotiation. Not one compact had been ratified and no new sites had been selected. *Id.* at 387; *see also* Berkovitz, *supra* note 17, at 447.

40. 42 U.S.C. §§ 2021b-2021j (1988); *see* Contreras, *supra* note 11, at 507.

The LLRWPAA reiterated the policies of the LLRWPA, but made two fundamental changes to the original Act. First, it extended until December 31, 1992, the period during which the three existing facilities had to accept extra-regional waste.[41] Second, the LLRWPAA established milestones which non-sited states had to meet toward siting and developing disposal facilities.[42] Failure to meet these milestones results in escalating disposal surcharges for use of the currently operating facilities, eventual shut-out from these facilities, and assumption of title to the waste itself.[43] As a further incentive toward facility development, states which meet the milestones are rebated a portion of the surcharges.[44]

Currently, only two LLRW disposal facilities are in operation in the United States.[45] Despite the fact that nine regional compacts have been ratified by Congress[46] and despite the financial penalties imposed by the LLRWPAA for failure to develop sites, no non-sited states are close to establishing a

41. 42 U.S.C. § 2021e (1988).

42. 42 U.S.C. § 2021e(d) (1988).

43. 42 U.S.C. § 2021e (1988). The "take title" provision was intended to act as an incentive to states to comply with LLRWPAA deadlines and expeditiously develop LLRW disposal sites. A state which assumed title to LLRW faced potentially huge liability for on-site storage by generators such as hospitals, universities and industries with no storage alternative. Contreras, *supra* note 11, at 521. In New York v. United States, 112 S. Ct. 2408 (1992), the United States Supreme Court declared the take title provision to be unconstitutional as it applies to noncompact states. Whether the take title provision is valid as to compact member states, and thereby continues to provide incentive for LLRWPAA compliance, remains unresolved. It has been suggested that the demise of the take title provision would leave little, if any, incentive for states to meet the 1996 deadline, and instead encourage on-site LLRW storage and place liability on waste generators. Contreras, *supra* note 11, at 521.

44. 42 U.S.C. § 2021e(d)(2)(B) (1988).

45. These are located at Barnwell, South Carolina, and Hanford (Richland), Washington. Contreras, *supra* note 11, at 490. A third site at Beatty, Nevada, closed at the end of 1992.

46. See Appendix A for a complete list of the interstate compacts, their member states, and citations where the text of each compact may be found. See Appendix B for a listing of each state's compact affiliation. As of the publication of this article, a tenth compact involving Texas, Vermont, and Maine is pending approval by the Vermont Legislature and the United States Congress. *Low-Level Radioactive Waste Management Activities in the States and Compacts*, LLRW Management Summary Report (Low-Level Radioactive Waste Forum, Washington, D.C.), Feb. 1994, at 14-15 [hereinafter *LLRW Summary Report*].

LLRW disposal facility, and it is expected that most states will fail to meet the last LLRWPAA milestone deadline in 1996.[47] The extant sites have shut down temporarily in the past[48] and recently have warned non-sited states that shut-out is again imminent.[49] It appears that a LLRW disposal crisis is looming.

Even though the volume of LLRW produced in the United States annually is levelling off or even dropping,[50] the dearth of commercial LLRW disposal facilities, combined with the threat of shut-out from existing facilities, may have drastic adverse effects on the environment, industrial produc-

47. As of February 1994, only two compact regions, the Southeast and Southwestern, have selected and approved new disposal sites, and expect their facilities to be operational sometime in 1996. *LLRW Summary Report*, *supra* note 46, at 10-13. The newly formed Texas Compact expects its new disposal facility also to be operational in 1996, but that Compact has not yet been ratified by one member state and the United States Congress. *Id.* at 14-15. The Northwest and Rocky Mountain Compacts will continue to store their LLRW at the Hanford, Washington site which has been in operation since 1965. *Id.* at 8-9.

All other compacts and unaffiliated states will miss the 1996 deadline by at least two to five years. The Central Compact has chosen a site, but does not expect its facility to be operational until 1998. *Id.* at 3. The Appalachian, Central Midwest, Midwest, and Northeast Compacts have no sites selected and do not expect operational facilities before 1998-2000. *Id.* at 2, 4-7. None of the unaffiliated states have chosen a site, and only Massachusetts and New York have projected operational dates of 2000-2001. *Id.* at 16-19.

48. *See supra* text accompanying notes 26-29. The disposal crisis which resulted from the 1979 shut-out led to passage of the LLRWPA.

49. Contreras, *supra* note 11, at 520. Both the Washington and South Carolina facilities have notified Connecticut, Massachusetts, New Jersey, Maine and New York that they may refuse LLRW from those states. *Id.* at 520 n.242 and accompanying text. Attempts by the sites to shut out 51 Michigan LLRW generators resulted in litigation. *See* Michigan Coalition of Radioactive Material Users v. Griepentrog, 945 F.2d 150 (6th Cir. 1991). South Carolina plans to close its facility to out-of-region generators as of June 30, 1994 and to all generators as of December 31, 1995. *LLRW Summary Report*, *supra* note 46, at 10.

50. The annual volume of LLRW shipped for disposal has dropped from approximately 3.25 million cubic feet in 1980 to 1.6 million cubic feet in 1988. Contreras, *supra* note 11, at 489. Due to the rising costs of LLRW disposal, producers of LLRW have reduced the volume of LLRW they generate by: (1) volume reduction before disposal; (2) substitution of non-radioactive material for radioactive isotopes in LLRW-generating processes; and (3) elimination of certain LLRW-generating processes. *Id.* One federal government study estimated that the current LLRW volume can be reduced a further 50% by following these reduction efforts. *Id.*

tion processes, and health care. Generation of LLRW will have to be curtailed, and generators will be forced to store their own waste.[51] Both consequences would have far-reaching implications. A shortage of disposal sites would create a crisis for research and medical institutions. Medically important radioactive materials may not be produced because of the waste storage problem and may become prohibitively expensive.[52] Likewise, on-site storage by LLRW generators who are ill-equipped to do so could create environmental and public health problems.[53] Few hospitals, universities, and companies have the space, equipment or expertise to handle and store LLRW.[54] Thus, many unregulated, unauthorized,

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51. *Id.* at 520. The NRC agrees that the lack of progress by states and compacts in developing new LLRW disposal sites will result in on-site storage by many LLRW generators. *See* 58 Fed. Reg. 6740 (1993). In an effort to minimize on-site storage and to encourage new disposal site development, the NRC has proposed regulations which (1) establish procedures and criteria for on-site storage of LLRW and (2) prohibit on-site storage after January 1, 1996, unless the generator can document that it has exhausted other reasonable waste management options. *Id.* at 6730-40. The proposed rule allows reasonable short-term storage necessary for the decay, collection, and consolidation of LLRW for off-site shipment to an operating LLRW disposal facility. *Id.* at 6733.

52. James Adelstein & Kenneth McKusick, *"Not in My Back Yard": Low-Level Radioactive Waste and Health*, 13 CURRENT MUN. PROBS. 482, 486 (1987). The temporary closures of the Nevada and Washington sites in 1979 created such a crisis. Several Massachusetts hospitals were forced to suspend cancer treatments and other medical activities relying on radioactive materials. Contreras, *supra* note 11, at 520. Because of the current effort to shut out Michigan LLRW, researchers at one hospital in that state have halted research involving animals. *Id.*

53. An unregulated and inadequate LLRW storage environment can cause waste package degradation from temperature fluctuation and corrosive atmospheres. 58 Fed. Reg. 6731 (1993). The integrity of LLRW packaging also may be threatened by external and internal corrosion, radiation-induced embrittlement of containers, and biodegradation of institutional wastes. *Id.* Waste package degradation in turn may result in radioactive spills or releases, which require handling of radioactive materials for waste repackaging and site cleanup. *Id.* As a result, workers and potentially the public will be exposed to additional doses of radiation. *Id.* In light of these dangers, the NRC believes that the protection of the public health and safety and the environment is better served by LLRW disposal in a limited number of licensed facilities, than by "long-term storage at hundreds or thousands of sites around the country." *Id.* Adoption of the NRC's proposed rules regarding on-site LLRW storage would make on-site storage an option of last resort. *See supra* note 51.

54. *See, e.g.*, Michigan Coalition of Radioactive Material Users v. Griepentrog, 945 F.2d 150, 153 (6th Cir. 1991). Another problem is that on-site storage

and potentially dangerous LLRW disposal sites will develop.[55]

It is unclear how great a role, if any, consideration of environmental liability has played in the continuing recalcitrance of states in siting and developing LLRW facilities.[56] Evaluation of state CERCLA liability for LLRW disposal is essential, in light of NRC regulations, state law and regional compact provisions that require state involvement in LLRW site selection, ownership, licensing, management, and long-term institutional control.[57] States which take steps to handle such liability without threat to their taxpayers or financial stability may be more able and willing to effectively implement the goals of both the LLRWPA and CERCLA.

IV. State Involvement in LLRW Disposal

The Atomic Energy Act authorizes the NRC to license the possession or use of radioactive byproduct material, which includes LLRW.[58] The NRC, in turn, may relinquish its regulatory authority over commercial LLRW to agreement states.[59]

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for isotope manufacturers may be illegal if the amount of isotope exceeds the amount the licensed manufacturer may have on its premises. Adelstein & McKusick, *supra* note 52, at 484.

55. Contreras, *supra* note 11, at 520-21; *see supra* notes 51, 53.

56. Although none specifically refers to CERCLA liability, several regional compact agreements address member states' liability for long-term maintenance, corrective and cleanup measures, and third-party damage. *See infra* notes 194-96 and accompanying text.

57. *See infra* text accompanying notes 58-95.

58. Hart & Glaser, *supra* note 11, at 773 n.540.

59. *Id.* at 773-74 n.540. The NRC may enter into an agreement transferring its regulatory responsibilities if the state's governor certifies that the state desires to assume regulatory responsibility, and the NRC finds that the state regulatory program is "compatible" with the NRC's and "is adequate to protect the public health and safety." AEA § 274(d)(1), 42 U.S.C. § 2021(d)(1). The NRC retains authority to periodically review state programs and to suspend or revoke a state program which no longer meets the adequacy and compatibility standards. 42 U.S.C. § 2021(j). *See* Hart & Glaser, *supra* note 11, at 774 n.540.

The agreement states are: Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Idaho, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Nebraska, Nevada, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Oregon, Rhode Island, South Carolina, Tennessee, Texas and Washington. Emilio Jaksetic, *Constitutional Dimensions of State Efforts to Regulate Nuclear Waste*, 32 S.C. L. REV. 789, 794 n.29 (1981).

Thus, agreement states regulate commercial LLRW disposal sites within their borders, the NRC regulates LLRW disposal sites in nonagreement states, and the LLRWPA authorizes states to regulate LLRW through interstate regional compacts.[60] States' roles in LLRW disposal are defined by all three sources of regulatory authority: NRC regulations, state law, and interstate compact provisions.

A. State Involvement Pursuant to NRC Regulations

Pursuant to the NRC's licensing requirements for land disposal of radioactive waste,[61] states play an active role in three aspects of LLRW disposal: site selection, licensing and long-term control. Involvement in each of these areas portends state CERCLA liability.

1. Site Ownership

The most problematic requirement for states evaluating and planning for CERCLA liability is that of site ownership. The NRC may license a commercial LLRW disposal site only on land owned in fee by the federal or state government.[62] The policy behind this requirement is to ensure long-term control of and responsibility for the waste site. Because disposal sites require maintenance and protection for up to 100 years after closure, private ownership and maintenance responsibility is considered infeasible.[63]

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60. Hart & Glaser, *supra* note 11, at 782. It is not clear whether the NRC or agreement states have jurisdiction over a regional LLRW disposal site established under a compact consisting of both agreement and nonagreement states. It has been suggested that the NRC retains licensing authority over any disposal site located in a nonagreement state. This, however, may abrogate the delegated authority of the compact's agreement state members. *Id.*

61. *See* 10 C.F.R. § 61 (1992).

62. 10 C.F.R. § 61.59(a) (1992). For purposes of this article, only the state ownership requirement will be analyzed.

Although state ownership is required before the NRC will issue a license for a disposal site, the application may be considered if the site is privately owned but arrangements have been made for the government to assume ownership before the license is issued. 10 C.F.R. § 61.7(c)(1) (1992).

63. Linda Cohen, *Who Pays the Bill: Insuring Against the Risks From Low Level Nuclear Waste Disposal*, 21 NAT. RESOURCES J. 773, 776 (1981). This policy of requiring state site ownership did not originate with the 1983 NRC regu-

2. Institutional Site Control

In addition to site ownership, the NRC regulations require state involvement in post-closure, long-term control of the disposal site.[64] During the operational phase of the site,[65] the private licensee is responsible for carrying out disposal activities in accordance with NRC regulations and license conditions.[66] After the disposal site has reached its capacity or for other reasons ceases to operate,[67] the private licensee remains responsible for site closure and stabilization activities, as well as post-closure observation and maintenance for five years.[68] At the end of the five-year period, the private

lations. Government site ownership has been a requirement since the inception of commercial LLRW disposal operations. 10 C.F.R. § 20.302 (1993). The AEC established regulations in 1961, which permitted commercial LLRW disposal only on federal or state land. Lynch, *supra* note 29, at 685. According to the NRC, the requirement was incorporated into the 1983 regulations "to assure adequate control of the disposal site after closure and to reduce the potential for inadvertent intrusion." 10 C.F.R. § 61.59 (1993).

64. 10 C.F.R. §§ 61.7(c)(2), 61.59(b) (1992).

65. The life of a typical LLRW disposal facility consists of the following phases: (1) pre-operational (site is selected and licensed), (2) operational (facility is constructed; waste is received and disposed of), (3) closure (after site is filled, buildings are decontaminated and dismantled, and site is finally contoured and prepared), (4) post-closure observation and maintenance (licensee continues to monitor and maintain site for five years to assure that site is stabilized and that only minor custodial care will be required), and (5) institutional control (state monitors site for up to 100 years to assure site integrity, perform minor maintenance, and prevent intrusions). 46 Fed. Reg. 38,086-87 (1981).

66. 10 C.F.R. § 61.7(c)(2) (1992).

67. The risk of premature disposal site closure is high, due to technical problems, poor management, faulty siting or design, transportation and packaging problems, site contamination by radioactive releases, or regulatory action "arising from changed attitudes toward the desirability of the facilities." Berkovitz, *supra* note 17, at 441; Cohen, *supra* note 63, at 780. Indeed, three of the six original commercial LLRW disposal sites closed within 15 years of opening, several decades ahead of schedule. Cohen, *supra* note 63, at 773, 777. *See* Contreras, *supra* note 11, at 511 n.187 (Maxey Flats opened in 1963, closed in 1977; West Valley opened in 1963, closed in 1975; Sheffield opened in 1967, closed in 1978). Premature closure may require extensive, and possibly unanticipated, expenditures for environmental liability, site stabilization, and development of a new site to accommodate the closed facility's LLRW generators. *See* Berkovitz, *supra* note 17, at 441 n.17.

68. 10 C.F.R. §§ 61.7(c)(3), 61.29 (1992). It is also the responsibility of the site operator to assure the availability of sufficient funds to close and stabilize the site so that "following transfer of the disposal site to the site owner, the need for ongoing active maintenance is eliminated to the extent practicable and

licensee may apply for a license transfer to the governmental site owner.[69]

Once the license has been transferred, the state is responsible for maintaining a program to physically control access to the site, to effect environmental monitoring, periodic surveillance and custodial care, and to administer funds to cover the cost of these activities.[70] This period of state control may last up to 100 years.[71] At the end of the institutional control period, the license is terminated.[72]

3. Participation in Site Licensing

The NRC regulations also authorize state involvement in the licensing of a LLRW disposal facility. Any state "whose interest is affected by a near-surface disposal facility" at a site proposed by the license applicant may submit to the NRC a proposal for the state's participation in the license application review.[73] State participation in the licensing process may include development of technical data to be used in the NRC's environmental impact statement, development of pub-

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only minor custodial care, surveillance and monitoring are required." 10 C.F.R. § 61.62 (1992). The NRC or agreement state may not issue a license for LLRW disposal until the licensee proves that adequate financial arrangements have been made for site decontamination, decommissioning, closure, and reclamation. Likewise, before the license may be terminated, the licensee must provide surety for long-term maintenance and monitoring. Nuclear Waste Policy Act § 151, 42 U.S.C. § 108 (1988).

69. 10 C.F.R. §§ 61.7(c)(3), 61.30 (1992).

70. 10 C.F.R. §§ 61.7(c)(4), 61.59(b) (1992). The purpose of controlling post-closure access to the site is to prevent human contact with the waste and destruction of site integrity. In particular, the state must prevent an intruder from excavating, drilling wells, or other activities that would expose the intruder to radiation or lead to off-site migration. 46 Fed. Reg. 38,085 (1981). During the period of institutional care, active controls may be replaced by less expensive passive controls, such as land records, deed restrictions, and monuments or trench markers, to ensure retention of knowledge of the site. *Id.* at 38,085, 38,087. The state may allow "productive" uses of the land which do not affect the site's stability and ability to meet performance objectives. 10 C.F.R. § 61.7(c)(4) (1992).

71. 10 C.F.R. § 61.59(b) (1992).

72. 10 C.F.R. §§ 61.7(c)(4), 61.31 (1992).

73. 10 C.F.R. § 61.72 (1992). An "affected state" includes the state where the facility will be located, a state that is a member of the compact that includes the sited state, or "any other state." *Id.*

lic participation mechanisms, provision of a technical data base to verify application materials, or exchange of state and NRC staff for cooperative review.[74]

B. State Involvement Pursuant to Agreement State Law

LLRW disposal facilities sited in agreement states are licensed and regulated by the states rather than by the NRC.[75] State regulations require much more extensive state involvement with the development and operation of LLRW disposal sites than do the NRC regulations, and thus expose states to greater risk of CERCLA liability.

Many states require state ownership of a LLRW disposal site.[76] Like the NRC site ownership requirement, the purpose of the state provisions is to ensure that radioactive waste disposal is handled by an entity capable of assuring long-term custodial care.[77] Some states also require that all radioactive material accepted for disposal at a site becomes

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74. 46 Fed. Reg. 38,087 (1981). State involvement with the proposed LLRW disposal facility may begin even prior to licensing. The NRC anticipates that the site owner who applies for a license will have had state participation and backing for a significant period of time before the application is actually submitted. 47 Fed. Reg. 57,460 (1982). State involvement in pre-license activities is allowed, and in some cases required, by state or compact law. *See infra* note 135; *supra* text accompanying notes 70-75.

75. Agreement state regulation of LLRW disposal sites is valid as long as it is compatible with NRC regulation and thus within the scope of the state's delegated authority under section 274 of the AEA. *See* Jaksetic, *supra* note 59, at 843; *supra* note 59 and accompanying text. Although the issue has not yet been addressed by the courts, it is proposed that statutes regulating LLRW disposal enacted by nonagreement states will be struck down, on the grounds that the federal government has preempted the field of radiation hazards. Jaksetic, *supra* note 59, at 843.

76. For example, Arizona, California, Illinois, Massachusetts, Nebraska, North Carolina, Texas, and Virginia all require that the land used for LLRW disposal be conveyed to the state and do not permit private ownership of such sites. *See* ARIZ. REV. STAT. ANN. § 30-692 (1986); CAL. HEALTH & SAFETY CODE § 25812(a)(1) (West Supp. 1993); ILL. ANN. STAT. ch. 111-1/2, para. 230.1 (Smith-Hurd Supp. 1992); MASS. ANN. LAWS ch. 111H, § 20(j) (Law. Co-op. 1991); NEB. REV. STAT. § 81-15,101(4) (Supp. 1992); N.C. GEN. STAT. § 104E-6.1 (1990); TEX. HEALTH & SAFETY CODE ANN. § 402.094 (West 1992); VA. CODE ANN. § 32.1-230(1) (Michie 1992).

77. Jaksetic, *supra* note 59, at 842.

the property of the state.[78] Several states even regulate disposal technology by prohibiting shallow land burial or by more specifically detailing the acceptable disposal method.[79]

The regulatory schemes of Nebraska and Illinois provide examples of state laws that require state involvement in all phases of site selection, development, operation and closure. Nebraska's Low-Level Radioactive Waste Disposal Act empowers its Department of Environmental Control with the authority to: (1) issue, modify, suspend, or revoke licenses or orders; (2) review plans and specifications for LLRW disposal facility siting, construction and operation; (3) require proper facility operation and maintenance; (4) establish record keeping, reporting and inspection requirements;[80] and (5) control disposal site design, technology, environmental monitoring, and plans for closure and stabilization, recovery and cleanup, and waste retrievability and removal.[81] In addition, the state may take direct responsibility for the decontamination, closure, decommissioning, reclamation, surveillance, or other necessary care of a site.[82]

Illinois' Low-Level Radioactive Waste Management Act[83] requires even greater state involvement in LLRW disposal

78. *See, e.g.*, ARIZ. REV. STAT. ANN. § 30-692B (1986); ILL. ANN. STAT. ch. 111-1/2, para. 230.6 (Smith-Hurd Supp. 1992); NEB. REV. STAT. § 81-15,102(3) (1987). A waste ownership requirement may subject the states to CERCLA "arranger" liability. *See infra* text accompanying notes 136-44.

79. *See, e.g.*, ILL. ANN. STAT. ch. 111-1/2, para. 241-6(c) (Smith-Hurd Supp. 1992) (shallow land burial prohibited); NEB. REV. STAT. § 81-15,101.02 (1987) (shallow land burial prohibited; disposal design must be above ground disposal or other technology which contains engineered, artificially constructed barriers to isolate waste from environment); TEX. HEALTH & SAFETY CODE ANN. §§ 402.225, .226 (West 1992) (shallow land burial prohibited; below-ground disposal prohibited unless it provides greater health and environmental protection than above ground disposal, and the LLRW is contained in reinforced concrete barrier and can be monitored and retrieved).

80. NEB. REV. STAT. § 81-1599 (1987).

81. NEB. REV. STAT. § 81-15,101.02 (1987). In contrast, Texas mandates state involvement in LLRW disposal sites in much broader language. Its regulatory agency must adopt rules governing site operation, acceptance of waste, site maintenance and monitoring, and activities relating to site management and operation. TEX. HEALTH & SAFETY CODE ANN. § 402.216(a) (West 1992).

82. NEB. REV. STAT. § 81-15,103(5) (1987).

83. ILL. ANN. STAT. ch. 111-1/2, paras. 241-1 to -24 (Smith-Hurd 1988 & Supp. 1992).

sites than does Nebraska's law. The state's Department of Nuclear Safety is mandated to regulate the design, construction, operation, maintenance, monitoring, record keeping and reporting, personnel qualifications, financial responsibility, decommissioning and post-closure maintenance of LLRW disposal facilities.[84] In addition, Illinois law sets forth specific criteria for LLRW disposal site selection, and the state is directly responsible for the final site choice.[85] The state also regulates the form in which LLRW may be disposed, the use of treatment technologies for recycling, compacting, solidifying or otherwise treating waste prior to disposal, and waste transportation.[86]

C. State Involvement Pursuant to Interstate Compact Provisions

State involvement in LLRW disposal sites also is mandated by provisions of the interstate compacts which have been formed pursuant to the LLRWPA.[87] Although not as detailed in their mandates as are state regulations, the compacts do establish in broad terms the responsibilities of host states, nonsited member states, and compact commissions in regard to LLRW disposal.

As to states which are designated to host a regional disposal facility, the compacts almost unanimously require the

84. ILL. ANN. STAT. ch. 111-1/2, paras. 241-5, -6 (Smith-Hurd Supp. 1992). In more sweeping terms, Texas requires that the contract between the state and the site operator must specify that the Texas Low-Level Radioactive Waste Disposal Authority "retains management authority over the disposal site and may monitor and inspect any part of the site and operations on the site at any time." TEX. HEALTH & SAFETY CODE ANN. § 402.214 (West 1992).

85. ILL. ANN. STAT. ch. 111-1/2, para. 241-12 (Smith-Hurd Supp. 1992). Texas law dictates that the disposal site shall be selected within a certain county and at a specifically described location. TEX. HEALTH & SAFETY CODE ANN. § 402.0921 (West 1992).

86. ILL. ANN. STAT. ch. 111-1/2, paras. 241-7, -9 (Smith-Hurd Supp. 1992).

87. *See* Appendixes A, B, and C. Throughout the remainder of this article, citations to the state compacts will be to their common name and the section within each compact. Appendix A contains a list of the compacts and citations to the public laws and statutes at large where the text of each may be found. Appendix B contains an alphabetical list of the 50 states and the compact each state has joined, if any. Appendix C contains the citations where each state has codified its respective compact.

sited state to ensure the timely and safe siting, design, development, licensing, regulation, operation, closure, decommissioning and long-term care of a LLRW disposal facility within its borders.[88] Two compacts require the host state to involve all other party states and the compact commissions in the operation of the regional facility by soliciting their comments as to siting, operation, financial assurances, closure, post-closure, and institutional control.[89]

Nonsited party states, as well as host states, are obligated by all compacts to regulate the packaging and transportation of LLRW generated within or passing through their borders.[90] Some nonsited states also are directed by their compacts to regulate the waste management, treatment and

88. *See* Appalachian Compact, art. 3(F)(a), (b); Central Compact, art. III(b), (d)(i); Central Midwest Compact, art. VI(f)(i), (g)(i); Midwest Compact, art. VI(e), (f)(i); Northeast Compact, art. III sec. 3.3, 5.5; Rocky Mountain Compact, art. 3D; Southwest Compact, art. 4(E). The Northeast Compact authorizes a host state to directly regulate the actual management of waste at a regional facility. Northeast Compact, art. III(c)(3).

At least one group of states has proven that it intends to enforce its host state's obligations under the terms of its compact. In 1987, the Midwest Compact selected Michigan as the region's host state. Michigan v. United States, 994 F.2d 1197, 1200 (6th Cir. 1993). When Michigan failed to submit to the NRC a disposal facility license application by the LLRWPAA deadline of January 1, 1990, each compact state had to certify that it could provide for its own LLRW disposal. *Id.* Subsequently, Michigan rejected three proposed sites and further delayed the siting process. In April 1991, the other members of the compact voted to revoke Michigan's membership due to its failure to meet its responsibilities as the host state. *Id.*

89. *See* Northeast Compact, art. V(d)(3); Rocky Mountain Compact, art. 3D(4). In contrast, the Southwestern and Appalachian Compacts specifically do not confer any authority on their respective commissions to license, develop, or regulate a regional facility. *See* Appalachian Compact, art. 2(B)(1); Southwestern Compact, art. 5.

90. *See* Appalachian Compact, art. 3(G)(2); Central Compact, art. III(e); Central Midwest Compact, art. V(d); Midwest Compact, art. V(d); Northeast Compact, art. III(b)(2); Northwest Compact, art. III; Rocky Mountain Compact, art. 3F(1); Southeast Compact, art. III(d); Southwestern Compact, art. 4(F)(1). This may include the authority to conduct inspections and to bring enforcement actions against violators. *See* Appalachian Compact, art. 3(G)(2); Northwest Compact, art. III; Rocky Mountain Compact, art. 3F(1); Southwestern Compact, art. 4(F)(1). The Northeast Compact qualifies the power to regulate packaging and transportation by prohibiting regulatory practices that "impose unreasonable burdensome impediments to the management of low-level waste in the region." Northeast Compact, art. III(b)(2).

storage technologies utilized by LLRW generators within their jurisdictions.[91]

Several compacts direct their respective compact commissions[92] to develop regional management plans to ensure the safe and efficient management of the region's LLRW.[93] In formulating the plan, the commissions are directed to determine the type and number of necessary regional facilities, promote source and volume reduction, develop alternative disposal methods other than SLB, and develop criteria for choosing a host state.[94] A compact commission may become directly involved in the development and operation of a regional facility, if no state volunteers to assume this responsibility or if no proposal for a facility is acceptable.[95]

Whether mandated by NRC regulation, state law, or compact provision, state site and waste ownership and involvement in management of a LLRW disposal facility will

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91. *See, e.g.*, Appalachian Compact, art. 3(F)(8) (member states are commanded to "prohibit the use of any shallow-land burial, . . . and develop alternative means for treatment, storage and disposal of low-level waste"); Southeast Compact, art. III(f) (member states must require their generators "to use the best available waste management technologies and practices to minimize the volumes of wastes requiring disposal.").

92. Each compact establishes a LLRW commission composed of voting members from each party state. The commission has general oversight authority over the administration of the terms of the compact. The commissions' functions include, *inter alia*, approving new compact members, mediating disputes between party states, designating a host state when necessary, authorizing importation and exportation of LLRW into or out of the region, overseeing the emergency closure of a regional facility, issuing regulations for implementation of the compact, and suspending privileges or revoking membership of party states. *See* Appalachian Compact, art. 2; Central Compact, art. IV; Central Midwest Compact, art. III; Midwest Compact, art. III; Northeast Compact, art. IV; Northwest Compact, art. V (low-level waste compact committee); Rocky Mountain Compact, art. 6 (low-level radioactive waste board); Southeast Compact, art. IV; Southwestern Compact, art. 3.

93. *See* Central Midwest Compact, art. IV; Midwest Compact, art. IV; Northeast Compact, Arts. IV(i)(5), V(a); Rocky Mountain Compact, art. 6(O)(7).

94. *See* Central Midwest Compact, art. IV.

95. *See, e.g.*, Central Compact, art. V. The Appalachian Compact goes so far as to mandate its commission to examine the financial records of site operators, including records pertaining to operating costs and profits. *See* Appalachian Compact, art. 2(B). Involvement in the private operator's finances is a factor considered by the courts in determining whether the state is liable under CERCLA as an operator. *See infra* text accompanying notes 120-35.

subject the state to CERCLA liability for radioactive releases from the site.

V. The Applicability of CERCLA to States and Their LLRW Disposal Facilities

The evaluation of CERCLA's potential impact on states for their LLRW-related activity involves a three-part analysis of: (1) whether CERCLA applies to radioactive releases from LLRW disposal sites; (2) whether under CERCLA states may be liable parties for contaminated LLRW sites; and (3) whether, as a matter of public policy, mandatory state control of LLRW should be maintained and, if so, whether states should be subject to or exempt from CERCLA liability for LLRW disposal.

A. CERCLA and LLRW Disposal

CERCLA imposes strict liability upon certain parties for cleanup costs and damages incurred as a result of a release or threatened release of a hazardous substance from a facility.[96] CERCLA's broad scope extends to releases of radioactive material from LLRW disposal facilities.[97] Consequently, states which act as owners, operators, generators, or transporters may be ordered by the EPA to clean up releases of radioactive

96. CERCLA § 107(a), 42 U.S.C. § 9607(a) (1988). The elements of a prima facie case under CERCLA are: (1) the site is a "facility"; (2) a "release" or threatened release occurred at the site; (3) the release caused the plaintiff to incur response costs; and (4) the defendants are responsible persons under section 107(a) of CERCLA. *See also* CPC Int'l, Inc. v. Aerojet-General Corp., 731 F. Supp. 783, 786 (W.D. Mich. 1989) (citing United States v. Aceto Agr. Chem. Corp., 872 F.2d. 1373 (8th Cir. 1989).

97. CERCLA defines "hazardous substances" to include any hazardous air pollutant listed in the Clean Air Act, which lists radioactive materials as hazardous. CERCLA § 101(14)(E), 42 U.S.C. § 9601(14)(E); Clean Air Act § 112, 42 U.S.C. § 7412. Under CERCLA, radioactive materials are considered hazardous wherever they are released, i.e. soil, air, or water. Steven R. Miller, *The Applicability of CERCLA and SARA to Releases of Radioactive Materials*, 17 Envtl. L. Rep. (Envtl. L. Inst.) 10,071 (1987).

A LLRW disposal site falls within the CERCLA definition of a "facility," as "any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located . . . ." CERCLA § 101(9)(B), 42 U.S.C. § 9601(9)(B).

materials from a LLRW disposal site or may be liable for reimbursement of Superfund expenditures for site cleanup.[98]

The broad definition of a "release" which triggers CERCLA liability encompasses various incidents likely to occur at a LLRW disposal site.[99] The primary pathway for public exposure to radiation from LLRW disposal facilities is through groundwater contamination.[100] Other potential pathways include ingestion of contaminated vegetation and livestock, inhalation of contaminated air, and direct irradiation.[101] This exposure may be caused by a radioactive release resulting from any of several activities at the disposal site during any phase of the life cycle of the site.

For example, radioactive material could be released prior to LLRW disposal due to transportation or packaging problems.[102] A release also may result from inadequate tem-

98. *See* Miller, *supra* note 97, at 10,072. There are four classes of persons potentially liable under CERCLA: (1) the present owner and operator of a facility; (2) the owner or operator of the facility at the time of disposal; (3) any person who arranged for the disposal of the hazardous substances at the facility; and (4) any person who transported hazardous substances to the disposal site. CERCLA § 107(a), 42 U.S.C. § 9607(a).

99. CERCLA defines the term "release" as "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment . . . ." CERCLA § 101(22), 42 U.S.C. § 9601(22). Excluded from the definition is a release of source, byproduct, or special nuclear material as a result of a nuclear incident subject to the financial protection requirements established by the Price-Anderson Act. *Id.* A typical LLRW disposal site does not fall within this exclusion. *See infra* text accompanying notes 198-216, for a discussion of the Price-Anderson Act.

100. Contreras, *supra* note 11, at 493. Radiation causes two types of damage to human tissue: somatic damage (typically manifested as cancer) and genetic damage. The exact relationship between low-level radiation exposure and these types of injury is not conclusively known. *Id.* at 491. The severity of exposure depends on time of exposure, distance from the source or quantity of source material ingested into the body, and type of radiation. Jon F. Merz, *Low Level Waste Injury: Liability Insurance and Indemnification*, 53 INS. COUNS. J. 362, 363 (1986).

101. Contreras, *supra* note 11, at 493.

102. The Hanford (Richland), Washington, site was closed temporarily on October 4, 1979, after boxes of radioactive scrap iron and gravel broke open in transit to the disposal site, leaking a barrel of cobalt-57, and after a shipment of depleted uranium that was 20,000 pounds overweight was transported in a truck with equipment defects. *Id.* at 512 n.194 and accompanying text. The Beatty, Nevada, site was closed when a truck with radioactive materials caught fire and exposed ten people to radiation, and another truck arrived at the site

porary pre-disposal storage at the site, or damage suffered during placement of waste containers into the disposal area.[103] After the waste has been buried but while the site is still under active operation, radioactive material could escape into the surrounding environment because of unstable waste forms and packaging, or faulty facility siting, design, and operations.[104] During the long-term institutional control period, a radioactive release may occur due to breach of the containment by slow deterioration or sudden intrusion.[105] Each of these types of releases from a LLRW disposal site may expose the state to CERCLA liability depending upon the state's relationship with and activity at the site.

B. The State as a Liable Party Under CERCLA

Even though the LLRWPA hands to the states responsibility for a recognized hazardous activity, there are no provisions within the LLRWPA that speak to state liability under CERCLA for releases of radioactive materials from a LLRW

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leaking contaminated liquid. *Id.* at 512 n.195. The concern over "slipshod packaging and negligent transportation" of radioactive materials on their way to disposal sites was the topic of much discussion during congressional hearings prior to passage of the LLRWPA. *Id.* at 512-13. Perhaps as a result, all regional compacts require their member states to regulate LLRW packaging and transportation. *See supra* note 90 and accompanying text.

103. *See, e.g.*, 58 Fed. Reg. 6730-40 (1993) (to be codified at 10 C.F.R. Parts 30, 40, 50, 70 and 72) (proposed Feb. 3, 1993); *supra* note 53 and accompanying text.

104. *See* Berkovitz, *supra* note 17, at 441. In 1977, the Maxey Flats, Kentucky, site was closed when contamination was found in nearby groundwater. The reason was traced to faulty packaging and site characteristics. The low permeability of the soil, the humid environment, and the disposal of the waste in easily degradable cardboard or fiberboard boxes resulted in settlement and accumulation of water in the trenches, which led to radiological contamination of the surface. *Id.* at 441 n.17. The West Valley, New York, and Sheffield, Illinois, sites also had problems with soil subsidence and water accumulation. *Id.*

105. During the long-term post-closure period, while the waste is still radioactive, breach of the waste containment may be caused by a sudden, severe incident such as an earthquake or human intrusion. In most cases, however, damage caused by radioactive waste after disposal will result from progressive deterioration of the containment system, causing slow contamination of the air, soil, or water through natural processes of leaching and migration. Merz, *supra* note 100, at 363 n.17.

disposal site.[106] Thus, it is necessary to examine CERCLA itself to determine whether states may fall within the CERCLA categories of liable parties.[107]

1. Owner Liability

CERCLA holds the owner of a facility containing hazardous waste strictly liable to the United States for expenses incurred in responding to the environmental and health

106. It is not surprising that the LLRWPA does not address the issue of environmental liability. Passage of the LLRWPA in 1980 was an expedient action resulting from pressure by the governors of the three states with operating disposal sites and from the perception of all other states that a LLRW disposal crisis was imminent. Colglazier & English, *supra* note 17, at 622. Consequently, the law passed with relatively little consideration by Congress of its long-term implications, and it provides only broad policy outlines rather than details for implementation. *Id.* Amendment of the LLRWPA in 1985 also resulted from mounting concern that the deadline for facility development would not be met and LLRW generators would face a disposal shut-out. *Id.* at 623. The congressional focus was on motivating the states to develop sites and assume responsibility for LLRW disposal, not on delegating liability for environmental disaster.

Interestingly, the NRC's proposed regulations for licensing LLRW disposal sites, published for comment in 1982, generated much discussion regarding the requirement of financial assurances for site closure and long-term care. *See* 47 Fed. Reg. 57,459 (1982). CERCLA liability was not specifically mentioned. Instead, comments focused on concern for protection of public health and safety and that potential site liability would not rest with state taxpayers. *Id.*

The NRC responded that the original licensee remains liable for "unanticipated contingencies" through the post-closure period, and financial responsibility for activities during the institutional control period should be worked out between the licensee and the state site owner in their lease. *Id.* However, a lease provision allocating liability will not absolve the state from liability under CERCLA which holds the state site owner liable to the federal government, regardless of whether another entity actually operated the site or whether the parties contractually allocated liability. *See* Tanglewood East Homeowners v. Charles-Thomas, Inc., 849 F.2d 1568, 1573 (5th Cir. 1988) (where owner and operator are different parties, both may be liable under CERCLA); *infra* text accompanying notes 187-93.

107. Other sources of state liability for releases of radioactive materials from LLRW disposal sites are state environmental liability law (mini-Superfunds) and state common law. Where radioactive materials migrate off-site or contaminate an intruder, the state may face liability for third-party personal injury and property damage claims based on negligence, strict liability, trespass or nuisance. *See* Merz, *supra* note 100. An analysis of state common law liability is beyond the scope of this article.

hazards posed by the waste in that facility.[108] Liability extends to the site owner at the time of the hazardous waste disposal,[109] as well as to the current owner.[110] Mandatory state ownership of a LLRW disposal site continues through all phases of the life of the disposal facility.[111] According to the NRC regulations, it is only after the long-term institutional control period that the license may be terminated and the land transferred from state ownership.[112] Thus, states which own LLRW disposal sites are both present and past owners liable under CERCLA for radioactive releases at the site.

State LLRW disposal site owners may take the position that they are exempted from CERCLA liability by the "involuntary acquisition" provision. CERCLA excludes from the definition of "owner" a state government which involuntarily acquired title to the site "by virtue of its function as a sovereign."[113] The sited state may assert that it acquired ownership of the disposal site solely pursuant to federal or state law, and thus involuntarily because of its sovereign status.

This argument will fail for two reasons. First, the choice of a state to host a LLRW disposal facility is a voluntary one, resulting from negotiations with other compact member states or a deliberate decision to "go it alone" and bear full responsibility for its LLRW disposal.[114] Second, it is doubtful

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108. CERCLA § 107(a), (b), 42 U.S.C. § 9607(a), (b) (1988).

109. CERCLA § 107(a)(2), 42 U.S.C. § 9607(a)(2) (1988).

110. CERCLA § 107(a)(1), 42 U.S.C. § 9607(a)(1) (1988). "Current owner" has been interpreted to mean the party who owned the site at the time the CERCLA lawsuit was filed. United States v. Fleet Factors Corp., 901 F.2d 1550, 1554 (11th Cir. 1990).

111. 10 C.F.R. § 61.30(a)(5) (1993); Merz, *supra* note 100, at 364.

112. 10 C.F.R. §§ 61.7, 61.30, 61.31 (1992).

113. CERCLA provides: "The term 'owner or operator' does not include a unit of State or local government which acquired ownership or control involuntarily through bankruptcy, tax delinquency, abandonment, or other circumstances in which the government involuntarily acquires title by virtue of its function as sovereign." CERCLA § 101(20)(D), 42 U.S.C. § 9601(20)(D) (1988). This exclusion does not apply where the state caused or contributed to the release. *Id.*

114. Peckinpaugh, *supra* note 12, at 26-30. Although nonagreement states are bound by the NRC requirement of state site ownership, agreement states are free to eliminate state ownership as a prerequisite to licensing of a disposal

that Congress intended the "involuntary acquisition" exemption to apply to state LLRW site ownership.[115] A state's acquisition of land which is fully intended for use as a hazardous waste disposal site is distinguishable from other exempted circumstances where the state involuntarily acquires title through bankruptcy, tax delinquency, or abandonment.[116] In those situations, the state government assumes control over property *which already has been contaminated*.[117] CERCLA's "polluter pays" policy would not be advanced if the governmental property owner were held liable where it played no part in the generation or disposal of hazardous waste at the contaminated site, nor had an opportunity to control the conditions at the site in order to prevent or abate the release.

Under federal and state law regulating LLRW disposal, however, states not only acquire ownership of land *prior* to its use as a disposal site, but also play a role in site selection and approval.[118] The state can evaluate the site prior to ownership, reject a site which is already contaminated from non-

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facility, thereby avoiding exposure to owner liability under CERCLA. Several states, in fact, do allow either state or private site ownership. *See, e.g.*, GA. CODE ANN. §§ 12-8-66, -103 (1992); MD. NAT. RES. CODE ANN. §§ 3-701 to -713 (Michie 1989). It is not clear whether eliminating the site ownership requirement renders the agreement state's program incompatible with the NRC's and thus subject to revocation. *See supra* note 59 and accompanying text.

115. Very few courts have examined this exemption, and none have interpreted the meaning of "involuntarily acquires title by virtue of its function as a sovereign." It has been suggested that to avail itself of the involuntary acquisition exemption, the state must show by a preponderance of the evidence that it would not have acquired ownership except to perform a necessary public function, such as obtaining an easement to contaminated property to perform flood control work necessitated by severe flooding. *See* James Sherman, *Altered States: The Article I Commerce Power and the Eleventh Amendment in* Pennsylvania v. Union Gas Co., 56 BROOKLYN L. REV. 1413, 1439 & n.105 (1991). The state owner of a LLRW disposal site would be unable to satisfy this burden of proof because the state has latitude in site selection and is not forced to accept a particular piece of property. *See infra* text accompanying notes 118-19.

116. CERCLA § 101(20)(D), 42 U.S.C. § 9601(20)(D).

117. *See* Rena I. Steinzor & Matthew F. Lintner, *Local Governments and Superfund, 1992 Update: Who Is Paying the Tab?*, 24 URB. L. 51, 77-78 (1992) (involuntary acquisition exemption applies where a government involuntarily assumes control of contaminated property).

118. *See supra* text accompanying notes 73-74, 80-86, 88-95.

LLRW activities, require site cleanup prior to acquiring ownership, and assert regulatory control over the site to minimize the risk of release.[119] Through these avenues, the state has ample opportunity to minimize environmental hazards posed by its own property and to reduce potential CERCLA liability. Thus, the involuntary acquisition exemption will not apply to state owners of LLRW disposal sites.

2. Operator Liability

CERCLA also imposes cleanup liability upon the past and current "operators" of a hazardous waste facility.[120] In dealing with perhaps the least understood and most litigated category of CERCLA liability, courts have struggled to delineate the boundaries of operator liability with no definitional guidance from CERCLA itself.[121] Difficulties particularly arise where the owner and operator functions are performed by different entities. A private corporation under contract with a state government to construct and operate a hazardous waste facility is clearly an operator, even if the state asserts actual day-to-day operational control.[122] In such a situation, however, it is not so clear whether the state government meets the criteria for operator liability under CERCLA.

The key element of operator liability is control over activities that caused the release, such that the defendant had the

119. *See* James K. Floyd, Note, *Piercing the Veil of Sovereign Immunity: Holding the States Liable in* Pennsylvania v. Union Gas Co., 35 S.D. L. REV. 341, 352 & n.117 (1990) (state can take preventive measures to avoid or minimize CERCLA liability by conducting thorough title search and extensive on-site inspection prior to state acquisition of land).

120. CERCLA § 107(a)(1), (2), 42 U.S.C. § 9607(a)(1), (2) (1988).

121. Kim E. Williamson & Thomas W. McCann, *After "Union Gas II": The State as an "Operator" under CERCLA*, 23 ARIZ. ST. L.J. 409, 409 (1991). CERCLA defines "operator" as any person operating a hazardous waste facility. CERCLA § 101(20)(A), 42 U.S.C. § 9601(20)(A). Both the CERCLA definition and its legislative history have been criticized as being "circular" and thus of no help to courts faced with the issue of operator liability. Williamson & McCann, *supra*, at 409, 412.

122. Williamson & McCann, *supra* note 121, at 410.

power to prevent and abate environmental damage.[123] Some courts have been reluctant, however, to apply this standard when evaluating operator liability for a state entity, due to the state's unique position as a regulator.[124] The few cases which have addressed this issue differ on whether an exemption exists under CERCLA for state regulatory activities.[125] Despite this controversy, the common thread throughout the operator liability cases is the courts' focus on the degree of the state's participation in daily site operation, personnel and financial matters, and environmental controls, in contrast with general regulatory and enforcement activities.[126]

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123. *See, e.g.*, United States v. Fleet Factors Corp., 901 F.2d 1550 (11th Cir. 1990) (secured creditor is operator if its involvement with facility management is broad enough that it could affect hazardous waste disposal decisions, even if it was not actually involved in daily operations nor participated in management decisions regarding hazardous waste); Rockwell Int'l Corp. v. IU Int'l Corp., 702 F. Supp. 1384 (N.D. Ill. 1988) (parent corporation was CERCLA operator of subsidiary facility where parent had control over hiring of subsidiary officers, established and monitored operational procedures, controlled procedures and equipment that directly affected disposal of hazardous substances); United States v. Carolawn Co., 14 Envtl. L. Rep. (Envtl. L. Inst.) 20,699 (D.S.C. 1984) (corporate officers liable as operators to extent they had control or authority over facility activities or participated in facility management). Some courts will not apply operator liability unless the defendant actually exercised control over pollution-causing activities. *See, e.g.*, In re Bergsoe Metal Corp., 910 F.2d 668 (9th Cir. 1990); Edward Hines Lumber Co. v. Vulcan Materials Co., 861 F.2d 155 (7th Cir. 1988); United States v. Mirabile, 15 Envtl. L. Rep. (Envtl. L. Inst.) 20,994 (E.D. Pa. 1985).

124. Williamson & McCann, *supra* note 121, at 418.

125. Regulatory activities such as permitting, licensing and promulgating regulations governing site selection, design, construction, or operation must be distinguished from cleanup and emergency activities. The courts are agreed that CERCLA exempts from liability state governments engaged in cleanup activities or responding to an emergency created by a release or threatened release of hazardous substances. *See* CERCLA § 107(d), 42 U.S.C. § 9607(d); *see, e.g.*, Stilloe v. Almy Bros., Inc., 782 F. Supp. 731 (N.D.N.Y. 1992) (state cleanup activities do not subject state to operator liability); United States v. Azrael, 765 F. Supp. 1239, 1245 (D. Md. 1991) (allowing counterclaims against state for cleanup activities would contradict CERCLA's goals to ensure prompt cleanups and to ensure that those who benefit financially from commercial activity will internalize health and environmental costs into cost of doing business).

126. The proper analysis of operator liability should focus on the state's specific acts of control over the activities causing the hazardous release and the state's ability to prevent the release, not on whether the state's conduct was regulatory in nature. Williamson & McCann, *supra* note 121, at 410. Under this analysis, pure regulatory conduct such as licensing, inspection, and en-

In *United States v. Stringfellow*,[127] for example, the court refused to create a regulatory defense where CERCLA does not provide for one and rejected the state's argument that it was acting as a regulator pursuant to its police power and thus could not be liable as an operator.[128] In that case, the court found that the state's control over the site went beyond mere regulation where it conceived, designed and regularly visited the site, had the knowledge and ability to abate harm, hired employees, and made operational decisions, including opening and closing the site and deciding what could be dumped there.[129]

In *United States v. Dart Industries*,[130] on the other hand, the court applied a regulatory exception to exonerate the state from CERCLA liability. It found that the state was not a CERCLA operator where it did not go beyond statutorily mandated governmental supervision to directly manage the

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forcement activities typically should not result in CERCLA liability. In contrast, the state which becomes involved in the site's daily operations should be held liable under CERCLA, just as a private party would be, if it meets the criteria for an "operator." Liability should be imposed despite the state's concomitant regulatory (licensing, inspection and enforcement) activities at the contaminated site. *Id.* at 410 & n.9. A "regulatory defense" would allow the state to escape CERCLA liability for the same acts for which a private party would be held liable, where the state serves in a dual capacity as regulator and operator.

127. 20 Envtl. L. Rep. (Envtl. L. Inst.) 20,656 (C.D. Cal. 1990).

128. *Id.* at 20,658. *Accord* FMC Corp. v. United States Dep't of Commerce, 20 Envtl. L. Rep. (Envtl. L. Inst.) 21,403 (E.D. Pa. 1990) (regulation is not a statutory defense to CERCLA operator liability; even assuming government acted only as regulator, it was not automatically immune from CERCLA liability).

129. *Stringfellow*, 20 Envtl. L. Rep. (Envtl. L. Inst.) at 20,658. The court identified eleven factors that should be weighed in determining whether a state is an operator under CERCLA:

> [E]xpertise and knowledge of dangers of hazardous waste, conception of idea of the site, design of the site, supervision, inspection, receipt of reports of the site, hiring or approving hiring of employees, determining operational responsibilities, control of disposal, ability to discover and abate harm, public declarations of responsibility, participation in opening and closing of site, and benefitting from the existence of the site.

Id. (citing Rockwell Int'l Corp. v. IU Int'l Corp., 702 F. Supp. 1384, 1390-91 (N.D. Ill. 1988)).

130. 847 F.2d 144 (4th Cir. 1988).

site's employees or finances, or engage in any hands-on activities that contributed to the release of hazardous waste.[131]

In applying the case law to the issue of state liability for LLRW disposal sites, it is necessary to analyze separately the state's liability exposure during the period when the site is operated by the private licensee and during the period after the license is transferred to the state. There is no question that the state may incur operator liability for releases occurring after license transfer. Even if the state contracts with private parties to provide actual maintenance, security, and other services during the institutional control period, the law clearly makes the state responsible for day-to-day control over the site.[132]

The more difficult question is whether the state is liable as an operator for releases occurring during the operational phase of the site's life. Pursuant to NRC regulations, state law, and compact provisions, a state's acts of control over a LLRW disposal facility can range from purely regulatory conduct to intensive day-to-day involvement.[133] In effect, the state can both regulate a LLRW disposal facility and be so intimately involved in daily activities such that it exercised control over site activities that caused or contributed to the release.

According to present case law, the relevant inquiry is whether the state's function at the LLRW site went beyond a

131. *Id.* at 146. *Accord* CPC Int'l, Inc. v. Aerojet-General Corp., 731 F. Supp. 783, 788 (W.D. Mich. 1989) (although mere regulatory activities will not subject state to CERCLA operator liability, state went beyond mere regulation, such as issuing permits and setting compliance standards, by engaging in hands-on activities that contributed to site contamination); United States v. New Castle County, 727 F. Supp. 854, 866, 870 (D. Del. 1989) (state was not CERCLA operator where it did not engage in active, voluntary, hands-on participation in daily site management and operations).

132. *See* 10 C.F.R. §§ 61.7(c)(4), 61.59(b) (1992); *supra* text accompanying notes 65-72. Even if the release occurs *prior to* license transfer, the state may be liable as a current operator if the CERCLA lawsuit is filed during the institutional control period. *See supra* notes 109-10 and accompanying text.

133. *Compare, e.g., supra* notes 81, 84, 88 and accompanying text (state regulatory authority to promulgate standards for site construction and operation) *with supra* text accompanying notes 62-72 (mandatory state site ownership and post-closure, long-term control).

merely regulatory one: that is, whether it managed the finances, employees, or daily operation of the site, or undertook any hands-on activities that contributed to the contamination. For example, the state's review of applications and issuance of licenses to construct and operate a LLRW disposal facility involves purely regulatory conduct, rather than hands-on involvement with daily site activities. Routine permitting and licensing will not expose the state to operator liability.[134]

In contrast, states may incur operator liability where they have actively controlled or participated in the site selection process, dictated acceptable waste treatment, management and disposal technologies, regulated and examined the private licensee's financial or personnel matters, directly regulated site management, or assumed direct responsibility for nonemergency site care.[135]

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134. *See CPC*, 731 F. Supp. at 788 (issuing permits and setting compliance standards are mere regulatory activities that do not give rise to operator status).

135. *See supra* notes 80-91 and accompanying text.

Direct involvement in LLRW disposal site selection poses a great risk of state exposure to CERCLA operator liability. Due to the controversial, and often political, nature of choosing a hazardous waste disposal site, state governments may be forced to take a much more active role in site selection than in other aspects of LLRW disposal. For example, Texas in 1981 passed the Texas Low-Level Radioactive Waste Disposal Authority Act, TEX. HEALTH & SAFETY CODE ANN. §§ 402.001-.298 (West 1992), for the specific purpose of siting, constructing, and managing a LLRW disposal facility. After an aborted attempt to contract with a private firm to conduct a site study and recommend acceptable LLRW disposal sites, the state itself evaluated three million acres of state-owned property before finally identifying one specific location for the disposal site. Colglazier & English, *supra* note 17, at 631-32.

Moreover, radioactive releases traceable to faulty site selection and design are not without precedent. *See supra* note 104. The courts are beginning to recognize the state's role in negligent site selection as a basis for CERCLA operator liability, and to look to state involvement in siting as one criterion to determine operator status. *See, e.g.*, United States v. Stringfellow, 20 Envtl. L. Rep. (Envtl. L. Inst.) 20,656, 20,657 (C.D. Cal. 1990) (state liable as CERCLA operator where it negligently selected, investigated, and designed hazardous waste site). Even nonsited states may face operator liability where, pursuant to compact provisions, they participate in the evaluation and selection of regional sites. *See supra* note 89 and accompanying text.

3. Arranger Liability

CERCLA imposes liability upon any entity which arranges for the disposal of hazardous waste at the contaminated site.[136] An arranger must either own, possess, or exercise control over the waste.[137] The test most often applied by the courts is whether a sufficient nexus exists between the alleged arranger and the owner of the waste, usually evidenced by the arranger's authority to decide on behalf of the owner where the waste will go.[138]

Where the state generates hazardous waste and arranges for its disposal, the state will face arranger liability because it not only owns the waste, but also exerts control over its disposal. Thus, state research facilities and medical institutions, for example, which produce LLRW and then arrange for its transportation and disposal are CERCLA arrangers.[139]

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136. CERCLA § 107(a)(3), 42 U.S.C. § 9607(a)(3) (1988).

137. Transportation Leasing Co. v. California, 22 Envtl. L. Rep. (Envtl. L. Inst.) 20,773, 20,780 (C.D. Cal. 1991).

138. *See, e.g.*, United States v. Northeastern Pharm. & Chem. Co., 810 F.2d 726, 743 (8th Cir. 1986) (plant supervisor who was directly responsible for arranging for waste transportation and disposal could be CERCLA arranger, even though company actually owned and possessed waste); Hassayampa Steering Comm. v. Arizona, 768 F. Supp. 697 (D. Ariz. 1991); United States v. New Castle County, 727 F. Supp. 854, 874 (D. Del. 1989); New York v. City of Johnstown, 701 F. Supp. 33, 36 (N.D.N.Y. 1988). Arranger liability may be triggered even where there is no express contract but merely an implied agreement regarding waste disposal. Courtaulds Aerospace, Inc. v. Huffman, 826 F. Supp. 345, 353 (E.D. Cal. 1993).

139. States subject to the LLRWPA's take title provision also will face arranger liability. The LLRWPA provides that a state which is unable by January 1, 1996, to provide for the LLRW generated within its borders must take title to and possession of the LLRW, at the request of the generator or owner of the waste. 42 U.S.C. § 2021e(d)(2)(C). This provision, as applied to a noncompact state, was struck down as unconstitutional in New York v. United States, 112 S. Ct. 2408 (1992). Whether the take title provision is valid as it applies to compact member states is an unresolved issue. If the provision is upheld, the state which is forced to take title to the waste presumably will have to arrange for its disposal and thus face CERCLA arranger liability. As one court noted, "[i]f a state . . . deposited its own hazardous wastes at a facility it owned, the mere fact that it was also operating in a regulatory capacity would not necessarily mean that it would escape liability under CERCLA." *New Castle*, 727 F. Supp. at 875.

It is not clear, however, if the state faces arranger liability as a result of its ownership, regulation, and possibly operation of a LLRW disposal site. Courts have not held states liable as arrangers for mere regulation of hazardous waste disposal facilities, even though state regulation may affect waste disposal decisions.[140] The state's role in permitting a particular facility or directing waste to be placed there does not constitute a sufficient nexus to the owner of the waste to give rise to CERCLA arranger status.[141]

Although a state sited with a regional LLRW disposal facility bears responsibility for its safe maintenance and operation, the cases suggest that such regulation is not a sufficient nexus to trigger arranger liability. Some regional compacts and state laws do require the state's extensive involvement in the siting of a LLRW disposal facility which will be the only such facility available to waste generators in the region.[142] It may be argued that by choosing and licensing the only available site, the state in effect has the authority to decide on behalf of LLRW owners where and how the waste will be disposed of. In light of the courts' failure to find state arranger liability in somewhat similar situations, it is doubtful that the selection and licensing of the sole disposal facility will constitute arranger status.[143] Courts are looking for a more direct connection between the state and the LLRW owner, in the form of a contractual, management, or financial arrangement.[144]

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140. *See, e.g., Transportation Leasing*, 22 Envtl. L. Rep. (Envtl. L. Inst.) at 20,773; *New Castle*, 727 F. Supp. at 854; *Johnstown*, 701 F. Supp. at 33.

141. B. F. Goodrich Co. v. Murtha, 958 F.2d 1192, 1199 (2d Cir. 1992) (sufficient nexus lacking where government is responsible only for promulgating disposal regulations or permitting disposal facilities); *Transportation Leasing*, 22 Envtl. L. Rep. (Envtl. L. Inst.) at 20,780; *New Castle*, 727 F. Supp. at 872, 874; *Johnstown*, 701 F. Supp. at 36.

142. *See supra* notes 80-86, 88-89, 135 and accompanying text. Involvement in facility siting may extend to nonsited states, as well as sited ones. *Id.*

143. *See Johnstown*, 701 F. Supp. at 36 (state not liable as arranger where it directed generators to dispose of their hazardous wastes at one of two disposal sites).

144. *See, e.g., New Castle*, 727 F. Supp. at 873 n.40; *Johnstown*, 701 F. Supp. at 36.

In summary, a state sited with a LLRW disposal facility may be exposed to CERCLA liability during each phase of the life of the facility. The state faces owner liability for hazardous releases occurring at any time, from initial licensing through the long-term institutional control period. The state will not be able to avoid CERCLA owner liability by application of the involuntary acquisition exemption. In addition, the state faces operator liability if the release occurs or the lawsuit is filed after license transfer and during the institutional control period. Whether the state will be held liable as an operator prior to license transfer depends upon a balancing of factors relating to the state's involvement in daily site management. Operator liability also may attach to a nonsited state which, pursuant to its compact agreement, participated in site selection and operation. Finally, states will not be considered arrangers, except as to LLRW generated by state institutions or owned by the state pursuant to the LLRWPA's take title provision.

C. The Demise of Sovereign Immunity Under CERCLA and Its Policy Implications for State Liability

Assuming that states will face CERCLA liability for radioactive releases from state-owned LLRW disposal sites, questions arise as to whether, as a matter of policy, such liability is desirable and whether the LLRWPA's system of state site ownership and control should be maintained. A consideration of the judicial trend to hold states liable for environmental cleanup to the same extent as private parties and of the policy arguments for and against state CERCLA liability results in an affirmative answer to both questions.

1. The Effect of *Union Gas* on State CERCLA Liability

The current attitude favoring imposition of state liability under CERCLA, rather than exempting governmental entities because of their sovereign status, may be traced to *Pennsylvania v. Union Gas Company*.[145] In its first decision

145. 491 U.S. 1 (1989).

dealing with CERCLA liability, the Supreme Court held that CERCLA intended to abrogate states' sovereign immunity under the Eleventh Amendment and to subject them to monetary damages in federal court in private party suits under CERCLA.[146] In so holding, the Court recognized the importance of sweeping liability under CERCLA and indicated its agreement with lower courts' liberal interpretation of CERCLA's liability provisions.[147] The decision implies that further expansions of liability are apt to be upheld.[148]

The *Union Gas* opinion is significant in evaluating state liability for LLRW disposal, because the Court so strongly interpreted CERCLA in favor of state liability. Historically, abrogation of state sovereign immunity has occurred only in very limited circumstances and only for the most compelling

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146. *Id.* at 5, 10, 23. The Eleventh Amendment provides that "[t]he Judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by Citizens of another State, or by Citizens or Subjects of any Foreign State." U.S. CONST. amend. XI. The Amendment's express language prohibits a foreign citizen or a citizen of another state from suing a state in federal court. In Hans v. Louisiana, 134 U.S. 1 (1890), however, the Supreme Court interpreted the Eleventh Amendment as also barring suits against the state by its own citizens. Throughout the past century, the *Hans* decision frequently has been criticized as having rewritten the Eleventh Amendment and given it a meaning its framers never intended it to have. *See, e.g.*, Scott Leary, *Recent Decisions*, 59 MISS. L.J. 771, 785 (1989). *See also* articles cited in *Union Gas*, 491 U.S. at 24 n.1. The *Union Gas* defendant argued that *Hans* should be overruled, but the Court did not reach this argument in rendering its opinion. *Union Gas*, 491 U.S. at 1, 23.

147. *See Union Gas*, 491 U.S. at 20; Martin J. Miller, *The Superfund Gets a New Pocket, As States May Now Have to Pay*, 21 U. TOL. L. REV. 985, 1001, 1005 (1990). The vast majority of decisions on CERCLA liability issues have construed CERCLA in a broad and liberal fashion. Carroll E. Dubuc & William D. Evans, Jr., *Recent Developments Under CERCLA: Toward a More Equitable Distribution of Liability*, 17 Envtl. L. Rep. (Envtl. L. Inst.) 10,197, 10,203 (1987). *See, e.g.*, Aceto Agric. Chem. Corp., 872 F.2d 1373, 1380 (8th Cir. 1989); United States v. New Castle, 727 F. Supp. 854, 859 (D. Del. 1989); United States v. Dickerson, 640 F. Supp. 448, 453 (D. Md. 1986). Liberal construction is necessary to effectuate CERCLA's two primary goals: (1) to enable the EPA to respond efficiently and expeditiously to toxic spills, and (2) to hold those parties responsible for the releases liable for the costs of cleanup. B. F. Goodrich Co. v. Murtha, 958 F.2d 1192, 1198 (2d. Cir. 1992).

148. *See Union Gas*, 491 U.S. at 21 ("*everyone* who is potentially responsible for hazardous waste contamination may be forced to contribute to the costs of cleanup") (emphasis in original).

reasons.[149] The *Union Gas* Court found that imposing state liability under CERCLA was such a compelling reason.[150] In effect, the balancing of the federal interest in environmental cleanup and the state interest in escaping liability for state owned or operated sites or state caused releases weighs heavily in favor of the national interest in making all responsible parties pay for response costs.[151] Thus, in the future when courts are faced with issues of state CERCLA liability for LLRW disposal sites, such as whether the state acted as a regulator or an operator, the scales will tip in favor of state liability. After the Court's decisive ruling in *Union Gas*, there is no doubt that CERCLA is to be construed to include the state as a potentially responsible party if its activities meet the criteria for owner, operator or arranger status.[152]

2. Public Policy and State CERCLA Liability for LLRW Disposal

To avoid inevitable CERCLA liability which, under the present regulatory scheme, states face for contaminated LLRW disposal sites, responsibility for LLRW site ownership and control could be returned to the federal government or passed to private hands. The likelihood of scrapping the entire LLRWPA system and returning to federal LLRW control is slim, considering the overwhelming state support for the

149. Miller, *supra* note 147, at 1002. For an extensive discussion of the Eleventh Amendment and its interpretation by the courts, see Merritt R. Blakeslee, Case Comment, *The Eleventh Amendment and States' Sovereign Immunity From Suit By a Private Citizen:* Hans v. Louisiana *and Its Progeny After* Pennsylvania v. Union Gas Company, 24 GA. L. REV. 113 (1989); Leary, *supra* note 146; W. Shan Thompson, Note, *CERCLA and the Abrogation of State Sovereign Immunity*, 6 B.Y.U. J. PUB. L. 457 (1992).

150. In a concurring opinion, Justice Stevens acknowledged that "Congress has decided that the federal interest in protecting the environment outweighs any countervailing interest in not subjecting States to the possible award of monetary damages in federal court . . . ." *Union Gas*, 491 U.S. at 28 (Stevens, J., concurring).

151. Sherman, *supra* note 115, at 1436-37.

152. Williamson & McCann, *supra* note 121, at 413. *See Union Gas*, 491 U.S. at 8 (CERCLA's "plain statement that States are to be considered 'owners or operators' in all but very narrow circumstances" conveys "a message of unmistakable clarity: Congress intended that States be liable along with everyone else for cleanup costs recoverable under CERCLA.")

LLRWPA at the time of its passage and the state efforts invested during the past thirteen years into compact negotiation and formation and site selection.[153] Likewise, the alternative of allowing private site ownership and control over long-term maintenance is undesirable, due to the nature of LLRW. The state government, unlike a private entity, is presumed to remain extant, and thus able to provide site care and security, as long as the LLRW remains radioactive and thus hazardous.[154]

A third alternative is to maintain the present system of state LLRW control, but to legislatively exempt states from CERCLA liability arising from activities relating to LLRW disposal sites. Proponents of such an exemption may assert that states, unlike private entities, are funded through taxes by citizens who have little control over how the state bureaucracy functions and how state funds are spent.[155] Furthermore, whereas private parties incur CERCLA liability as a result of profit-making activities, states sited with LLRW disposal facilities will face CERCLA liability by performing a public service. Finally, by shouldering the economic burden of environmental cleanup costs, the state may neglect or abandon other social goals for lack of funds.[156]

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153. It has been suggested that the LLRWPA is unworkable, and that LLRW disposal should be returned to federal management. One author opines that the compact system may not be able to solve the LLRW disposal problem, due to: (1) conflicts among states and between the states and federal government; (2) the undeveloped nature of interstate compact law; and (3) the possibility of compact fragmentation into smaller groups of states which would cause increases in disposal costs and environmental dangers. Prochaska, *supra* note 12, at 383.

Others oppose reopening the LLRW debate because it would be counterproductive to efforts of complying states, and it would defeat the policy behind the LLRWPA that those who produce LLRW should take care of it. *See, e.g.*, Cecil D. Andrus, *Protecting the Environment — Folly of Mismanaging Radioactive Waste*, TRIAL, Sept. 1991, at 26, 28 ("When this principle is effectively enforced, we will see significant reductions in the volume of waste produced; increases in waste recycling; and reasonable, effective disposal solutions for waste that cannot be reduced or recycled.").

154. *See supra* note 63 and accompanying text.

155. *See* Thompson, *supra* note 149, at 473.

156. Similar arguments have been presented by opponents of imposition of municipal liability under CERCLA for household hazardous waste. *See* Molly A. Meegan, Note, *Municipal Liability for Household Hazardous Waste: An*

Although these are legitimate concerns, they are not insurmountable problems. Holding states liable under CERCLA for LLRW disposal activities need not unduly burden taxpayers or reduce funds available for other social programs.[157] There are many viable ways for the states to limit actual expenditures for cleanup liability through settlement agreement provisions, indemnity agreements, generator surcharges, special liability funds, and mandatory insurance.[158] Moreover, the intent of Congress was to hold all parties responsible for environmental contamination to pay for the cleanup, not just those who profited from the waste disposal.[159] Although states may not benefit in a proprietary sense from controlling LLRW disposal, their taxpayers do obtain the benefit of having a necessary public service performed.[160]

Imposing CERCLA liability on states for LLRW disposal is consistent with one of CERCLA's primary goals to place the burden of cleanup on all entities responsible for the damage. If states are exempted from liability, their responsibility for a portion of cleanup costs will shift inequitably to private parties or the federal government.[161] Additionally, the potential imposition of strict liability under CERCLA will provide an incentive for the state to exercise maximum care in siting,

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Analysis of the Superfund Statute and Its Policy Implications, 79 GEO. L.J. 1783, 1797-98 (1991).

157. As one court noted, however, "burdensome consequences are not sufficient grounds to judicially graft an exemption onto a statute, a graft that would thwart the language, purpose, and agency interpretation of the statute." B. F. Goodrich Co. v. Murtha, 958 F.2d 1192, 1206 (2d Cir. 1992) (holding that CERCLA imposes liability on a municipal government for arranging for household waste disposal).

158. *See infra* text accompanying notes 176-82, 187-93, 217-27.

159. Meegan, *supra* note 156, at 1797.

160. *See B. F. Goodrich*, 958 F.2d at 1204.

161. Meegan, *supra* note 156, at 1793. Holding states, as well as all other responsible parties, liable is necessary to prevent depletion of the Superfund. Because federal funds are limited, the federal government cannot shoulder the entire burden of cleanup. Leary, *supra* note 146, at 785; Meegan, *supra* note 156, at 1792. Moreover, states represent a significant percentage of owners and operators of hazardous waste sites nationwide. These areas may remain contaminated if the Superfund cannot finance cleanup, there are no other viable responsible parties, and the states are exempted from liability. *Id.* *See also* Pennsylvania v. Union Gas, 491 U.S. 1, 22 (1989).

regulating and maintaining LLRW disposal sites, and thus will deter unsafe disposal practices.[162] As the site owner and operator, the state will be in the best position to minimize disposal risks.[163]

VI. Balancing the Scales: Maintaining and Limiting State Liability for LLRW Disposal Sites

Although as a matter of policy ownership and control of LLRW disposal sites should remain in state hands and states

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162. Meegan, *supra* note 156, at 1793. Absent a cause of action for money damages, there is less incentive for a state to voluntarily participate in environmental cleanups. *See Union Gas*, 491 U.S. at 22. Potential CERCLA liability will motivate states to clean sites quickly and more efficiently, in order to limit expenditure of state funds for cleanup as well as for ultimate liability. Christopher A. Brodman, Note, Pennsylvania v. Union Gas Company: *The Supreme Court Employs the Wrong Means to Reach the Proper End*, 23 AKRON L. REV. 531, 543 (1990).

It may be feared that the threat of potential CERCLA liability will lead states to underregulate LLRW disposal to avoid becoming site operators. Three factors make such a result unlikely. First, states cannot circumvent the standards established by the NRC for the licensing and regulation of LLRW disposal. LLRW facilities in nonagreement states are licensed and regulated directly by the NRC. *See supra* note 60 and accompanying text. Agreement state regulation of LLRW disposal must be compatible with, and thus at least as stringent as, NRC standards. *See supra* notes 59, 75 and accompanying text. The NRC may revoke a state's authority to regulate LLRW if the state's regulatory program is not "adequate to protect the public health and safety." AEA § 274, 42 U.S.C. § 2021(j); *see supra* note 59. A state which tends toward underregulation to avoid CERCLA liability may find its agreement state status revoked for failure to meet the "compatibility" and "adequacy" requirements. *See supra* note 59.

Second, compact member states are obligated to abide by the terms of their interstate agreements, which carry the full force of federal law. *See supra* note 37. The nine extant compacts generally require their members to regulate all aspects of LLRW disposal, from waste packaging and transportation to disposal site design, development, licensing, regulation, operation, closure, and long-term maintenance. *See supra* notes 87-95 and accompanying text. Compact members can revoke a state's compact membership for its failure to adequately regulate LLRW. *See supra* note 88.

Finally, the public's pronounced fear of nuclear accidents and negative perception of radioactive waste management may force state legislatures to police LLRW handling and disposal as stringently as possible. *See* Contreras, *supra* note 11, at 499-505.

163. Furthermore, as the primary regulators of LLRW disposal sites, states "are in the right position to uncover, report and treat problems." Cohen, *supra* note 63, at 785.

should remain subject, where appropriate, to CERCLA liability, the imposition of such liability need not be draconian, inequitable, or financially devastating. Several statutory, contractual and legislative tools may be utilized to ensure that states will assume liability for environmental damage for which they are responsible and that funds other than from taxpayers will be available to satisfy liability claims.

A. CERCLA Provisions

CERCLA itself provides a number of mechanisms whereby the courts, as well as the EPA, may take the status of state governments into consideration when determining financial responsibility for cleanup costs.

1. Judicial Apportionment of Damages

Once liability is established under CERCLA, the court may impose joint and several liability, which makes each defendant liable for the entire cost of cleanup, or it may hold each defendant liable only for its share of the costs.[164] The state seeking to limit its liability for a LLRW disposal site will urge the court to apportion liability.

According to the majority view, also known as the *Chem-Dyne* approach,[165] joint and several liability should be imposed where the harm is indivisible; where there is a reasonable basis for dividing the harm, the court should apportion liability among the parties according to the share of harm caused by each.[166] This approach may not benefit the state liable for a LLRW disposal site, however, because it may be difficult for the court to find that the state's responsibility as

164. Dubuc & Evans, *supra* note 147. If liability is joint and several, the United States may recover the entire judgment from any one defendant. If liability is apportioned, the shares of absent or insolvent parties go uncompensated. *Id.*

165. *See* United States v. Chem-Dyne Corp., 572 F. Supp. 802 (S.D. Ohio 1983).

166. *See* United States v. Monsanto Co., 858 F.2d 160 (4th Cir. 1988); Steinzor & Lintner, *supra* note 117, at 111. The *Chem-Dyne* approach is typically applied where many generators have contributed to the contamination, and the separate volumes of waste contributed by each generator can be determined. *Id.*

an owner or operator is divisible from the responsibility of the LLRW generators or private operator.[167]

A minority view, the *A & F Materials* approach,[168] prefers to apportion damages to avoid unfair results, even where the environmental harm is indivisible. This approach allows the court to take into account the two competing policy implications of state liability: (1) allocating cleanup costs based on a party's responsibility for the contamination, and (2) considering the identity of a responsible party and its ability to pay.[169] Apportionment is based upon consideration of several criteria: the party's ability to demonstrate that its contribution to the hazardous disposal or release may be distinguished; the amount and toxicity of the party's waste; the party's involvement in the waste generation, transportation, treatment, storage, or disposal; the party's degree of care exercised with the waste; and the party's cooperation with government officials to prevent harm to public health or environment.[170]

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167. The divisibility of harm defense focuses on site conditions rather than on the conduct of PRPs. *See* David Montgomery Moore, *The Divisibility of Harm Defense to Joint and Several Liability Under CERCLA*, 23 Envtl. L. Rep. (Envtl. L. Inst.) 10,529, 10,531 (Sept. 1993). The issue of whether an environmental harm is "divisible" and thus whether liability should be apportioned may depend upon such factors as the volume, toxicity, migratory potential, synergistic capacity, and traceability of the hazardous substances at the contaminated site. *Id.* at 10,531.

168. *See* United States v. A & F Materials Co., 578 F. Supp. 1249 (S.D. Ill. 1984). This approach was developed by judges hesitant to apply joint and several liability where its application could lead to an unfair allocation of liability, particularly where small parties are involved. Steinzor & Lintner, *supra* note 117, at 112.

169. *See* Meegan, *supra* note 156, at 1799-1800, in which the author urges application of the *A & F Materials* analysis to municipal liability for generation of household waste.

170. *A & F Materials*, 578 F. Supp. at 1256. These factors were originally proposed in the unsuccessful Gore Amendment to CERCLA, which called for the consideration of equitable factors in the division of costs of Superfund liability. The Amendment was passed by the House, but later died in the Senate. Meegan, *supra* note 156, at 1799. Courts have concluded that the Amendment's failure does not prohibit the use of equitable factors in apportioning liability, citing congressional statements that the final compromise bill implicitly incorporated the Gore Amendment's approach. *See, e.g., A & F Materials*, 578 F. Supp. at 1256-57; Steinzor & Lintner, *supra* note 117, at 113. Other courts have limited the use of the Gore factors to allocating costs among parties in private

Because the *A & F Materials* approach is best suited to situations involving multiple owners, operators, transporters, and generators,[171] its application is appropriate to apportion liability among parties responsible for a contaminated LLRW disposal site. In applying the *A & F Materials* criteria, the court should take into account the state's minimal involvement in waste disposal, exercise of proper regulatory care at the site, response to the release and participation in removal and remedial activity, ability to pay, the public service and mandatory nature of the state's role as site owner, and the potential burden on taxpayers.[172] Where the state has acted only as the site owner during the operational phase of the site, contributed no or minimal LLRW to the site, and did not have sufficient hands-on management involvement to be considered a CERCLA operator, the court accordingly should assign a minimal portion of liability to the state.

2. Right of Contribution

CERCLA provides parties with an explicit right of contribution, and authorizes the court to use equitable factors in allocating liability for contribution claims.[173] Thus, the state which has been held liable to the federal government under CERCLA for a LLRW disposal site may seek contribution from other parties who contributed to the contamination, such as generators, transporters, and private site opera-

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contribution actions, and have not allowed the factors as a defense to joint and several liability. Moore, *supra* note 167, at 10,532.

171. Dubuc & Evans, *supra* note 147, at 10,199.

172. If the release occurs during the site's operational phase and the state is determined to be a co-operator, the court may find it difficult to apportion liability between the state and the private operator, unless there is evidence of distinct acts of negligence by one party that caused the release. If the release occurs during the site's long-term institutional control phase, liability may be apportioned more easily if it can be shown that the release was caused by handling during disposal, such as damaged waste containers, or by faulty site construction, such as inadequate containment. The burden will be on the state to demonstrate its minimal contribution to the release. *See* United States v. Monsanto Co., 858 F.2d 160, 172 (4th Cir. 1988); Steinzor & Lintner, *supra* note 117, at 111-12.

173. CERCLA § 113(f), 42 U.S.C. § 9613(f) (1988).

tors.[174] In resolving the state's contribution suit, the court may follow *A & F Materials* by considering the state's unique role at the site and other equitable factors.[175]

3. Settlement Devices

States which enter into a settlement agreement with the EPA regarding liability for LLRW disposal sites may be protected from unlimited or disproportionate liability by various CERCLA provisions that may be incorporated into the settlement agreement.[176] First, a state which settles with the

174. The right of contribution is particularly important to states sited with a LLRW disposal facility, in light of CERCLA's "matching share" rules. CERCLA requires states to provide 10% of the funds necessary to clean up privately owned or operated hazardous waste sites, and at least 50% of cleanup funds for a publicly owned and operated site. The EPA has the authority to require a share larger than 50%, taking into account the culpability of the state for the site. CERCLA § 104(c)(3), 42 U.S.C. § 9604(c)(3) (1988). *See* Rena Steinzor, *Local Governments and Superfund: Who Will Pay the Tab?*, 22 URB. L. 79, 95 (1990). Through a contribution action, the state may recoup a portion or all of its matching share expenditures.

175. *See, e.g.*, United States v. R. W. Meyer, Inc., 932 F.2d 568, 572 (6th Cir. 1991) (Gore factors are appropriate in resolving contribution claim, but should not be exhaustive); United States v. Northernaire Plating Co., 20 Envtl. L. Rep. (Envtl. L. Inst.) 20,200 (W.D. Mich. 1989) (applying Gore factors to divide response costs between site owner and two generators in contribution action). *See* Steinzor & Lintner, *supra* note 117, at 114-15.

For an example of how one court allocated cleanup costs among third-party defendants in a contribution suit, see Advance Circuits, Inc. v. Carriere Properties, Nos. 84-3316, -4591 (D. Minn. Feb. 18, 1987). The court held the site owners and operators liable for 70% of the cleanup costs and the generators 30% liable. In reaching this apportionment, the court considered, *inter alia*, that: (1) the actions of the owners and operators were the substantial cause of the release; (2) they had control of the waste treatment and storage; (3) they were uncooperative with government authorities; and (4) they were experts in waste handling and aware of the hazardous nature of the waste. *Id.* *See* Dubuc & Evans, *supra* note 147, at 10,201-02, for a discussion of this case.

176. The settlement devices discussed in this section also will benefit nonsited compact states which, by virtue of their involvement in the selection, design, or management of the LLRW disposal site, may be considered site operators and thus subject to CERCLA liability. One additional settlement device is available to nonsited states which generate their own LLRW at state research and medical institutions or assume ownership of LLRW through the LLRWPAA's take title provision, and thus are subject to CERCLA arranger liability. *See supra* note 139 and accompanying text. These states may be spared disproportionate liability by CERCLA's "de minimis" settlement provision. The EPA is authorized to enter into a final settlement agreement with a party who

United States is protected from nonsettlors' contribution claims.[177] Second, CERCLA authorizes the EPA to enter a "mixed funding" agreement with the settling state, whereby the federal government will reimburse the state for costs of cleanup actions which the state agrees to perform and the federal government agrees to finance.[178] Third, the EPA has the discretion to include in a settlement agreement a covenant not to sue, which protects the state from future liability to the United States arising from issues covered by the agreement.[179] Finally, CERCLA authorizes the EPA to prepare "non-binding preliminary allocations of responsibility" (NBARS), which distribute percentages of the total response costs among potentially responsible parties.[180] Although the NBAR is neither a binding statement of liability nor admissible evidence,[181] the EPA recognizes it as a powerful tool to promote settlement, especially in cases involving state governments as potentially responsible parties.[182]

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is responsible for only a minor portion of response costs because the volume and toxicity of the party's contributed waste are minimal compared to other hazardous substances at the site. CERCLA § 122(g), 42 U.S.C. § 9622(g) (1988).

177. CERCLA §§ 113(f)(2), 122(h)(4), 42 U.S.C. §§ 9613(f)(2), 9622(h)(4) (1988). *See, e.g.*, City and County of Denver v. Adolph Coors Co., 829 F. Supp. 340 (D. Colo. 1993).

178. CERCLA § 122(b)(1), 42 U.S.C. § 9622(b)(1) (1988).

179. CERCLA § 122(f), 42 U.S.C. § 9622(f) (1988). Although the EPA has the authority to grant a full release from future liability, most covenants not to sue contain a reopener clause which allows the EPA to sue the settling party for liability resulting from conditions that were unknown at the time the remedial action was completed. CERCLA § 122(f)(6)(A), 42 U.S.C. § 9622(f)(6)(A) (1988).

180. CERCLA § 122(e)(3), 42 U.S.C. § 9622(e)(3) (1988).

181. CERCLA § 122(e)(3)(D), 42 U.S.C. § 9622(e)(3)(D) (1988).

182. *See* Steinzor, *supra* note 174, at 99. Courts give the government's apportionment of liability great deference in approving proposed settlement agreements and consent decrees. United States v. Montrose Chem. Corp., 827 F. Supp. 1453, 1458 (C.D. Cal. 1993).

Although CERCLA's settlement provisions on their face apply to states as well as to all liable parties, a more direct, albeit politically cumbersome, approach to limiting state liability involves congressional amendment of CERCLA to include settlement provisions specifically applicable to states liable for LLRW disposal sites. Such legislation could include: a moratorium on actions against the state until settlement with the EPA is reached, a limitation of state liability if payments would force a state to default on debt obligations or face other financial ruin, a covenant not to sue, protection from contribution claims, and provisions for contribution of services instead of cash, delayed payments or

4. EPA Enforcement Policy

Another possible approach to limiting state CERCLA liability for LLRW disposal is the development by the EPA of an enforcement policy addressing this issue. The EPA has implemented successfully a similar policy to remedy the substantial exposure to CERCLA liability that local governments face for municipal solid waste (MSW) disposal. The Interim Municipal Settlement Policy[183] states that the EPA will not prosecute local governments whose only connection to a Superfund site was the generation or transportation of MSW, unless the EPA obtains site-specific information that the MSW contains commercial or industrial hazardous wastes.[184]

Similarly, the EPA could adopt an enforcement policy dealing with state liability for LLRW disposal sites. Like the Municipal Policy, the LLRW policy might provide that the EPA will not prosecute states whose only involvement at the site is ownership and regulatory activity mandated by state or federal law or interstate compact, absent evidence of specific state conduct contributing to the release. Although as a discretionary enforcement policy it would not be binding on the EPA and would not protect states from contribution claims by generators and operators,[185] as a practical matter the policy may encourage settlement and thereby benefit both the EPA and liable states.[186]

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payments over time. Legislation has been proposed to Congress with similar provisions applicable to municipalities liable for generation or transportation of municipal solid waste. *See* Steinzor & Lintner, *supra* note 117, at 154-55 (discussing the Toxic Cleanup Equity and Acceleration Act of 1991).

183. EPA, Interim Municipal Settlement Policy, 54 Fed. Reg. 51,071 (1989) [hereinafter *Municipal Policy*].

184. *Id. See* Steinzor & Lintner, *supra* note 117, at 84-90, for a detailed discussion of the *Municipal Policy*.

185. The *Municipal Policy* has no legal effect and is not binding as to how the EPA prosecutes a CERCLA action. It does not affect a local government's potential legal liability under CERCLA, nor does it preclude third-party contribution claims against the government. *B. F. Goodrich*, 958 F.2d at 1205-06.

186. Regional EPA offices have made a good faith effort to implement the *Municipal Policy*, which has been praised as a "conscious effort to provide innovative settlement opportunities for local governments." Steinzor & Lintner, *supra* note 117, at 84 n.147, 89.

Two problems arise in the formulation of a LLRW enforcement policy, which are not applicable to the *Municipal Policy*. First, it may be difficult for

B. Contractual Allocation of Liability

The harshness of CERCLA's strict joint and several liability may be cushioned by a contractual agreement allocating CERCLA liability between the state and the private LLRW disposal site operator.[187] The agreement might expressly provide that the operator will indemnify and hold the state harmless for all CERCLA liability, including damages, response costs and third-party contribution claims, resulting from the presence of LLRW on the site prior to the transfer of the license to the state site owner, or resulting at any time due to the operator's conduct.[188] The private operator would not have to indemnify the state for state-caused liability. Such a provision will protect the state from CERCLA liability for contamination caused by the operator, yet will maintain state liability during the institutional control period when the state is both owner and operator. In this way, the indemnity provision furthers CERCLA's policy to make both state

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the EPA to delineate what type of state activity is regulatory and thus not subject to prosecution, and what type of activity constitutes operator status under CERCLA and should be prosecuted. Second, limiting EPA's enforcement efforts may fly in the face of the LLRWPA's policy to make states responsible for their citizens' LLRW and CERCLA's policy of holding site owners and operators liable for hazardous releases.

187. The state LLRW disposal site owner typically enters into a lease agreement or other contractual arrangement with a private entity to develop and operate a disposal facility on the state-owned land. *See, e.g.*, New York State Energy Research & Dev. Auth. v. Nuclear Fuel Serv., Inc., 666 F.2d 787 (2d Cir. 1981) (private firm entered into "lease and waste storage agreement" to construct and operate LLRW burial facility); *see* 10 C.F.R. § 61.63 (1992); 46 Fed. Reg. 38,086 (1981). Allocation of environmental liability should be included in this contract. Courts thus far have been unwilling to imply a right to indemnification for CERCLA liability. Lynn E. Richter, Note, *"AM Int'l v. International Forging Equipment": Does CERCLA Allow Private Parties to Contractually Allocate Liability for Cleaning Up Contaminated Sites?*, 22 U. TOL. L. REV. 1065, 1073-78 (1991).

188. A similar hold harmless and indemnity provision was incorporated into a land purchase agreement in Versatile Metals, Inc. v. Union Corp., 693 F. Supp. 1563 (E.D. Pa. 1988).

In the LLRW context, the provision may be more effectively implemented if the contract also requires an environmental audit of the LLRW disposal site immediately prior to license transfer, to evaluate waste containment, site integrity, and the presence of contamination. The private operator may seek to limit the indemnity provision to liability arising from conditions noted in the environmental audit.

and private polluters pay and LLRWPA's policy to hold the states responsible for LLRW.[189]

Federal courts are split as to whether CERCLA allows private parties to contractually allocate CERCLA liability.[190] Some courts, including the only appellate court thus far, have held that CERCLA voids any contractual agreement between parties as a defense to a federal government-instituted action, but allows parties to contractually allocate among themselves responsibility for CERCLA response costs.[191]

A minority view has concluded that CERCLA prohibits all contractual releases of CERCLA liability among potentially responsible parties, but allows contracts with other parties not liable under CERCLA, so that additional liability by way of insurance or indemnity may be provided.[192] This interpretation has been criticized, however, as contrary to the majority of decisions considering the issue, misinterpreting CERCLA and its legislative history, hampering commercial

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189. Without contractual allocation of liability, states may be unwilling to serve as host states under the LLRWPA, which will exacerbate the present problem in siting additional LLRW disposal facilities. *See supra* text accompanying notes 45-49.

190. The center of the judicial controversy is section 107(e)(1), which states:

> No indemnification, hold harmless, or similar agreement or conveyance shall be effective to transfer from the owner or operator of any vessel or facility or from any person who may be liable for a release . . . to any other person the liability imposed under this section. Nothing in this subsection shall bar any agreement to insure, hold harmless, or indemnify a party to such agreement for any liability under this section.

CERCLA § 107(e)(1), 42 U.S.C. § 9607(e)(1) (1988).

191. Richter, *supra* note 187, at 1074. *See, e.g.*, Mardan Corp. v. C. G. C. Music, Ltd., 804 F.2d 1454, 1459 (9th Cir. 1986) ("In other words, parties may shift their responsibility for response costs among each other, but they may not thereby escape their underlying liability to the Government or to another third party."); Central Ill. Pub. Serv. Co. v. Industrial Oil Tank & Line Cleaning Serv., 730 F. Supp. 1498, 1507 (W.D. Mo. 1990); Southland Corp. v. Ashland Oil, Inc., 696 F. Supp. 994, 1000 (D.N.J. 1988). *See also* James W. Conrad, Jr., *CERCLA Does Not Invalidate Contractual Allocations of Liability*, 22 Envtl. L. Rep. (Envtl. L. Inst.) 10,045, 10,048 n.46 (1992) (quoting Purolator Prods. Corp. v. Allied-Signal, Inc., 772 F. Supp 124, 129 (W.D.N.Y. 1991)).

192. *See, e.g.*, Harley-Davidson, Inc. v. Ministar, Inc., 837 F. Supp. 978, 984 (E.D. Wis. 1993); AM Int'l, Inc. v. International Forging Equip., 743 F. Supp. 525, 528-29 (N.D. Ohio 1990). See Conrad, *supra* note 191, for a discussion of cases which address this issue.

ventures, impairing freedom of contract, and hindering private-party cleanup efforts.[193]

Thus, although it may be unclear which view will prevail until the issue is considered by other appellate courts, the state sited with a LLRW disposal facility may follow the better-reasoned majority view and rely on a valid contractual provision to allocate CERCLA liability.

C. Statutory Allocation of Liability

In addition to private contractual provisions, states may allocate or limit their CERCLA liability for LLRW disposal sites through state or federal statutory provisions.

1. Interstate Compact Provisions

Interstate compact agreements provide a convenient and valid medium for allocation or limitation of CERCLA liability.[194] Compacts may allocate long-term LLRW disposal site liability by requiring each party state to share in site-related liability based on each state's proportionate share of the total volume of waste disposed of at the site. Concomitantly, the compacts should specifically reserve to each member state the right to assert contribution claims.[195] In this way, liability is fairly distributed among member states which all use the regional site, yet the states may seek reimbursement from a private operator or sited state whose conduct caused or contributed to the release. On the other hand, a compact agreement may limit its members' CERCLA liability by speci-

193. Conrad, *supra* note 191; Richter, *supra* note 187.

194. Interstate compact provisions are enforceable federal law. Peckinpaugh, *supra* note 12, at 32-33; *see supra* note 37.

State laws may also allocate liability. Nebraska, for example, requires that remedial cleanup costs incurred during the long-term custodial care period "shall be assessed first to the facility operator, then proportionately against the generators of the radioactive waste." NEB. REV. STAT. § 81-15,102(3) (1987). This statutory allocation of liability will not insulate the state from liability to the EPA under CERCLA, but it may be recognized as a valid allocation of liability as among the state and private parties. *See supra* text accompanying notes 187-93.

195. *See* Appalachian Compact, art. 3(H); Central Midwest Compact, art. VI(q).

fying that no party state shall be liable for any damage resulting from a regional LLRW disposal facility not located within that state.[196]

Just as contractual agreements regarding CERCLA liability, compact agreements to allocate, assign, disclaim or limit liability are subject to the question of whether CERCLA permits such agreements.[197] The better and majority view is that compact provisions will not affect each state's CERCLA liability to the federal government, but will be acknowledged as valid allocations of liability among the states themselves.

2. Application of the Price-Anderson Act

States also may look to federal law to limit their CERCLA liability for LLRW disposal. One possible source of liability limitation is the Price-Anderson Act (PAA)[198] which combines mandatory insurance, liability limitation, and federal government indemnification provisions to assure availability of funds for liability claims arising from nuclear incidents.[199]

Under the PAA, in order to receive a construction permit and operating license for certain nuclear facilities, licensees must obtain financial protection to cover public liability claims.[200] The liability insurance must be in the maximum amount of coverage available at a reasonable cost on the private market.[201] In the event that public liability from a nuclear incident exceeds the licensee's required insurance

196. *See* Northeast Compact, art. IIIb(8); Southwestern Compact, art. 4(F)(9).

197. *See supra* text accompanying notes 187-93.

198. Pub. L. No. 85-256, 71 Stat. 576 (1957) (current version at 42 U.S.C. §§ 2012, 2014, 2039, 2073, 2210, 2232, 2239).

199. The PAA has two principal goals: protection of the public by assuring the availability of funds to satisfy accident claims, and protection of the nuclear industry by removing the threat of tremendous potential liability. Dean R. Tousley, Note, *Abolishing the "Extraordinary Nuclear Occurrence" Threshold of the Price-Anderson Act*, 14 U. MICH. J.L. REF. 609, 610 (1981).

200. 42 U.S.C. § 2210(a) (1988). *See* Leslie D. Lass, Comment, *The Price-Anderson Act: If a "Chernobyl" Occurs in the United States, Will the Victims Be Adequately Compensated?*, 7 GLENDALE L. REV. 200, 204 (1986).

201. 42 U.S.C. § 2210(b)(1) (1988). The maximum amount currently available from private insurance pools is $200 million.

coverage, the federal government, in some circumstances, will indemnify the licensee up to a liability limit of $560 million per incident.[202]

The insurance and indemnification requirements of the PAA are mandatory only as they apply to production and utilization facilities (reactors, enrichment and reprocessing plants).[203] The NRC does have the discretion, however, to extend the PAA to other NRC licensees, including LLRW disposal site owners and operators, by requiring that the licensee maintain financial protection as a condition of the license.[204]

Extension of the PAA to LLRW disposal sites may encourage voluntary facility siting and alleviate the burden on state governments of CERCLA's strict joint and several liability. As a matter of sound public policy, however, extension of the PAA is not desirable for several reasons.

First, application of the PAA to a LLRW disposal site may frustrate EPA's efforts to ensure that the site is expeditiously cleaned in the event of a radioactive release into the environment. CERCLA does not apply to releases of radioactive materials to which the PAA applies.[205] Thus, if the PAA is extended to LLRW disposal facilities, the EPA could not,

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202. 42 U.S.C. § 2210(c), (e) (1988). Federal indemnity does not apply to liability for incidents at commercial nuclear reactors. Where liability exceeds mandatory private insurance, each utility licensed to operate a reactor must contribute a pro rata share up to $63 million per reactor per incident. 42 U.S.C. § 2210(b)(1) (1988). The total limit of liability per reactor incident is approximately $7.5 billion.

203. 42 U.S.C. § 2210(a) (1988). The PAA covers public liability claims arising from nuclear incidents at these facilities, as well as during transportation of radioactive materials to and from the facilities. *See* Merz, *supra* note 100, at 362. It does not cover incidents caused by radioactive waste after it reaches its disposal destination. *Id.*

204. 42 U.S.C. §§ 2210(a), 2111 (1988). It has been proposed that extension of the PAA to LLRW facilities is logical, because most LLRW is generated by commercial nuclear power plants. Merz, *supra* note 100, at 374. Because the PAA provisions are conditions of a NRC license, the PAA could be extended to LLRW disposal facilities sited in nonagreement states, where these sites are licensed by the NRC. The PAA could not be applied to LLRW disposal sites licensed by agreement states, unless the NRC first revoked the agreement states' licensing authority.

205. CERCLA excludes from its coverage a "release of source, byproduct, or special nuclear material from a nuclear incident, . . . if such release is subject to requirements with respect to financial protection established by the [NRC]

pursuant to its authority under CERCLA, order potentially responsible parties to undertake removal and remedial action, file an enforcement action, or clean up the site and seek reimbursement through a cost recovery action.[206]

Second, the PAA applies only to "public liability claims" arising from a nuclear incident, which as defined by the PAA does not include on-site damage.[207] Thus, the PAA's guaranteed private insurance and federal indemnity funds would not be available to cover on-site damage and cleanup costs. Also, Superfund monies might be unavailable for on-site cleanup, if application of the PAA to off-site claims precludes application of CERCLA to on-site damage resulting from the same incident.[208]

Third, and perhaps most importantly, application of the PAA rather than CERCLA to contaminated LLRW sites would eliminate CERCLA's strict liability standard and substantially reduce the pool of parties legally responsible for site cleanup and environmental damages. CERCLA imposes strict liability for hazardous waste cleanup on certain classes of persons, with no consideration of fault.[209] The scope of CERCLA's liability is considered by the courts to be quite broad, to effectuate the statute's "polluter pays" policy.[210] Under the PAA, however, claims for damages resulting from a nonextraordinary nuclear occurrence are subject to the tort

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under [section 170 of the AEA] . . . ." CERCLA § 101(22)(C), 42 U.S.C. § 9601(22)(C) (1988).

206. *See* CERCLA §§ 104, 106, 107, 42 U.S.C. §§ 9604, 9606, 9607 (1988). There may be other state or federal environmental laws, however, that authorize the government to effect or order site cleanup.

207. 42 U.S.C. § 2014(w) (1988).

208. As the two statutes currently read, it is unclear whether both CERCLA and the PAA may be applied to cover different damages resulting from the same radioactive release. The PAA covers only off-site damage; CERCLA is precluded from applying to radioactive "releases" subject to the PAA. *See supra* notes 205, 207. If one "release" causes off-site damage covered by the PAA, CERCLA cannot be used to remedy on-site damage caused by the same "release." The two statutes could be made more compatible by amending CERCLA to clarify that it is precluded from applying only to the same damage as the PAA, rather than to the same "release."

209. *See supra* notes 96, 98.

210. *See supra* note 147.

law of the state in which the nuclear incident occurred.[211] In states which would not apply strict liability to a radioactive release from a LLRW disposal site, the claimant would bear the burden of proving traditional negligence elements of duty and breach.[212] Thus, under the PAA, the government's ability to effectuate cleanup and hold polluters liable for environmental damage at LLRW disposal sites would vary from state to state and would be subject to more difficult and expensive burdens of proof.[213]

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211. If a nuclear incident is deemed by the NRC to be an "extraordinary nuclear occurrence," the nuclear facility licensee is required to waive defenses to liability based on (1) the claimant's conduct or fault (unless intentional), (2) charitable or governmental immunity, and (3) statute of limitations if the suit is brought within three years of the date of discovery of injury or 20 years of the date of the nuclear incident. 42 U.S.C. § 2210(n)(1). The practical effect of these required waivers is to create strict liability. Lass, *supra* note 200, at 207.

The waivers were enacted to alleviate congressional concern that under the original PAA, which depended on state tort law, claimants would not be adequately compensated in the event of a nuclear accident. *Id.* at 206-07. Not all states would impose strict liability, negligence might be difficult to prove, and a state's shorter statute of limitations could bar radiation injuries which might become obvious only many years after the incident. *Id.* A federal rule of strict liability under the PAA was rejected, however, in deference to the nuclear industry. *Id.* at 207.

As a final resolution, Congress amended the PAA to impose strict liability only in situations involving an extraordinary nuclear occurrence (ENO). 42 U.S.C. § 2014(j). An ENO is defined as an event causing a discharge of nuclear material "in amounts offsite, or causing radiation levels offsite," which the NRC determines to be substantial and will result in substantial offsite damage. *Id.* The NRC's determination as to whether an incident is an ENO is final and not subject to review. *Id.*; *see* Lass, *supra* note 200, at 208. The ENO standard may be impossible to meet for claimants seeking damages from a LLRW release. Even the Three-Mile Island incident in 1979, considered at the time to be "the most serious accident in the history of civilian nuclear power," was not deemed an ENO. Tousley, *supra* note 199, at 618-19. Following such precedent, a LLRW disposal site release would probably not trigger the PAA's strict liability provision.

212. Interestingly, the PAA's waiver of defenses as to fault was not considered critical to the success of Three-Mile Island claims for economic and health-related losses. Pennsylvania common law applies strict liability to abnormally dangerous activities, which presumably would apply to nuclear operations. Tousley, *supra* note 199, at 621 & n.72. Even without state strict liability, the claimants were not prejudiced because, as a special inquiry into the incident concluded, there was documented evidence of negligence. *Id.*

213. Potentially liable parties under CERCLA's strict liability scheme include owners, operators, generators, arrangers, transporters, corporate officers, shareholders, and secured creditors. *See* Williamson & McCann, *supra* note

For all these reasons, extension of the PAA to LLRW sites would circumvent important public policy objectives. Limiting liability for environmental damage or shifting liability from state to federal taxpayers[214] contradicts CERCLA's goals to deter bad waste management practices, encourage voluntary cleanup, hold the polluter fully responsible for all damage caused by the release, and effect prompt and complete cleanup, and also contradicts the LLRWPA's policy of holding the polluter state responsible for LLRW disposal damage.[215] Although CERCLA cannot guarantee insurance and indemnity funds for off-site cleanup as could the PAA, this is not fatal to CERCLA's efficacy at LLRW sites, because other sources of guaranteed funds may be tapped to cover both on- and off-site cleanup costs.[216]

D. Alternative Sources of Funding for CERCLA Liability

The potential for CERCLA liability need not inhibit states from assuming responsibility under the LLRWPA for hosting a LLRW disposal site. Various sources of funding are available to guarantee payment of CERCLA claims without depleting limited state coffers or imposing additional burdens on state taxpayers.

121, at 411-19. It may prove virtually impossible to prove actual negligence against most, if not all, of these parties in the event of a radioactive release from a LLRW disposal site.

214. Where the liability from a radioactive release exceeds the level of private insurance coverage, federal taxpayers would be exposed to up to $360 million in indemnity payments. *See supra* text accompanying note 202.

215. In contrast, a predominant goal underlying the PAA is to protect the nuclear industry from unlimited liability and thus to encourage private development of nuclear technology. This incentive is not relevant to CERCLA, which seeks to discourage the mishandling of hazardous waste and hold responsible parties fully liable for environmental damage.

Furthermore, it is not clear that the PAA's liability limitation is necessary to protect the integrity of state treasuries. The NRC declined to require LLRW disposal site licensees to carry third-party liability insurance, through the framework of the PAA, because it felt such "catastrophic" coverage exceeded the risk at a low-level waste facility. 47 Fed. Reg. 57,460 (1982).

216. *See infra* text accompanying notes 217-35.

1. Environmental Liability Fund

A popular method of ensuring funds for long-term liability for LLRW disposal sites is to establish an environmental liability fund financed by private site operators and LLRW generators. Several states have shifted responsibility for long-term site maintenance and liability to private site operators by levying a per cubic foot charge which is deposited into an earmarked escrow fund.[217] When the license is transferred from the private operator to the state site owner, this fund should be large enough to cover not only long-term institutional maintenance, but also some portion of potential CERCLA liability.[218]

Additionally, an environmental liability fund may be financed by a disposal fee imposed by the operator upon waste generators who utilize the disposal site. The LLRWPA regional compacts almost unanimously grant authority to sited states to impose generator fees.[219] Although some compacts do not specify how generator fees are to be used,[220] most com-

217. Cohen, *supra* note 63, at 776.

218. *Id.* at 776-80.

219. The fees are generally based on volume of LLRW, *see, e.g.*, Rocky Mountain Compact, art. 5(B), but may also be based on the hazard of the waste. *See* Central Midwest Compact, art. VI(j); Midwest Compact, art. VI(i); Southwestern Compact, art. 3(G)(3). The Southeast Compact is unique in not speaking to the issue of generator fees.

Funding liability through generator fees furthers CERCLA's goal of placing financial responsibility for cleanup costs on hazardous waste generators, rather than on state taxpayers. Because the fee system is based on waste volume, it also encourages LLRW volume reduction and more efficient waste treatment and handling practices.

220. For example, the Rocky Mountain Compact provides that generator fees "may be used by the host state for any purpose authorized by its own law, including but not limited to, costs of licensure and regulatory activities related to the regional facility, reserves for decommissioning and long-term care of the regional facility and local impact assistance." Rocky Mountain Compact, art. 5B. The Central Compact is even more generally worded, allowing a host state to charge reasonable user fees at the regional facility to "cover any costs associated with such facilities." Central Compact, art. III(d).

Arguably, the state may use a nonspecific escrow fund to pay for environmental cleanup liability. To assure the availability of generator fees for CERCLA liability, however, states should legislatively mandate that the funds are to be used for costs of cleanup, remedial actions, and other liability obligations under CERCLA.

pacts require that the fees be applied to perpetual care and maintenance of the site,[221] as well as to cleanup costs, corrective measures, and third-party property damage and personal injury claims arising from a radioactive release from the site.[222]

2. Mandatory Insurance

Another manner in which states can ensure the availability of funds for long-term environmental liability is to require the site operator to maintain property damage and liability insurance. Several states and regional compacts require operator insurance to cover payment of liability claims, as well as cleanup and corrective action.[223] Although not required by its regulations, the NRC also strongly encourages LLRW disposal site operators to maintain liability coverage for off-site damages.[224]

Site operators may find it difficult, however, to find adequate private insurance coverage for CERCLA liability. Commonly held commercial liability policies may not provide

221. *See* Appalachian Compact, art. 3(F)(4) (disposal charges must be sufficient to fully fund safe disposal and perpetual site care); Northeast Compact, art. V(f) (user fees shall cover costs of development, operation, administration, regulation, closure, post-closure observation and maintenance, and institutional control); Northwest Compact, art. IV, § 6; Southwestern Compact, art. 4(E)(3) (disposal fees must be sufficient for safe disposal, long-term care and inspection, enforcement, and surveillance activities).

222. The Central Midwest Compact, for example, authorizes the host state to establish a user fee system to provide sufficient revenue to cover, *inter alia*, long-term liability associated with the facility. Central Midwest Compact, art. VI(j). The Compact defines "long-term liability" as the financial obligation to compensate personal injuries, property damage, and to provide for the costs of "any necessary corrective action or clean-up on real or personal property caused by radioactive releases from a regional facility." *Id.* art. II(j). *See also* Appalachian Compact, art. 3(F)(9) (generator fees to pay for preventive or corrective measures at facility); Midwest Compact, art. VI(i) (fee system to provide for long-term liability); Southwestern Compact, art. 3(G)(3) (surcharge may finance third-party liability fund to compensate personal injury or property damage during operation, closure, stabilization, and post-closure and institutional control periods).

223. *See* Central Midwest Compact, art. V(p); Northeast Compact, art. IX(a); Southwestern Compact, art. 4(F)(9); NEB. REV. STAT. § 81-15,103(1) (1987).

224. *See* 47 Fed. Reg. 57,459-60 (1980).

coverage for CERCLA response costs.[225] On the other hand, insurance policies which are specifically designated to cover environmental liability or liability for nuclear activities may be prohibitively expensive.[226] To remedy this problem, the cost of insurance could be paid from the environmental liability fund or could be borne by generators through a state-authorized earmarked fee.[227]

3. In-Kind Contributions in Lieu of Cash

An alternative to expenditure of state funds to finance CERCLA cleanup activities or to satisfy at least a portion of CERCLA liability claims is for the state to render services and use of equipment in lieu of cash payments. In-kind contributions may include the use of state vehicles, equipment and personnel to implement removal and remedial activity.[228] Such an arrangement, of course, would have to be acceptable to the EPA, and would not protect the state from

225. The commercial or comprehensive general liability policy (CGL) is a standard form of liability insurance that has been issued throughout the United States for more than 20 years with few alterations of coverage terms. Aetna Cas. & Sur. Co. v. General Dynamics Corp., 1989 WL 380494 (E.D. Mo. Dec. 12, 1989). The federal courts are hopelessly split as to whether CGL policies cover liability for hazardous waste cleanup and natural resource damages. *Compare* Aetna Cas. & Sur. Co. v. General Dynamics Corp., 968 F.2d 707, 710 (8th Cir. 1992) (CGL policy does not cover CERCLA response costs), *with* Upjohn Co. v. Aetna Cas. & Sur. Co., 768 F. Supp. 1186 (N.D. Mich. 1990) (CERCLA cleanup costs are damages within CGL policy coverage).

226. *See* Cohen, *supra* note 63, at 775; Merz, *supra* note 100, at 374.

227. *See, e.g.*, ILL. ANN. STAT. ch. 111-1/2, para. 241-14(b)(4) (Smith-Hurd Supp. 1992) (Low-Level Radioactive Waste Facility Closure, Post-Closure Care and Compensation Fund, financed by generator fees, may be used to purchase "facility and third-party liability insurance necessary during the institutional control period").

It also has been suggested that the state insure the operator and the federal government reinsure states for losses at a LLRW disposal site in excess of a certain amount. Cohen, *supra* note 63, at 786-87. Government-subsidized operator insurance is consistent with the policy that requires public ownership of LLRW disposal sites because private owners would not be as reliable for extremely long-term site maintenance and protection. *Id.* at 776. It is not unusual for the federal government to intervene as an insurer for activities, such as floods and nuclear power plant accidents, for which private insurance is not available at a reasonable cost. *Id.* at 782.

228. *See* Meegan, *supra* note 156, at 1800; Steinzor & Lintner, *supra* note 117, at 134.

payment of cash to settle or satisfy third-party contribution claims.[229]

4. Multi-Layered Environmental Liability Coverage

The most comprehensive manner in which a state may guarantee the availability of sufficient funds to cover CERCLA liability throughout the entire life of the LLRW disposal site is to combine mandatory operator insurance, a liability fund financed by generator fees and operator contributions, and proportionate allocation of liability among all compact member states.

The Central Midwest Compact, for example, establishes a multi-layered liability compensation system, which is designed to cover personal injury and property damage claims, as well as costs of cleanup and corrective action.[230] The private operator of the regional facility is required to purchase liability insurance, which serves as the primary layer of environmental liability coverage.[231] The host state is required to maintain an "Extended Care and Long-Term Liability Fund" financed by volume- or hazard-based generator fees and by operator fees for payment of future premiums to ensure continued, long-term insurance coverage.[232] As a secondary layer of coverage, the Fund may not be used to satisfy environmental liability until the operator's insurance funds are exhausted.[233] Finally, where environmental liability exceeds the first two layers, all compact member states share the excess liability based on their proportionate contribution

229. In an analogous area, legislation encouraging municipalities to contribute services instead of money to satisfy CERCLA liability has been proposed to Congress. *See* Steinzor & Lintner, *supra* note 117, at 155.

230. Central Midwest Compact, art. VI(o), (p). To be most effective, the compact should specify that its liability compensation system is to be used to satisfy state CERCLA liability for radioactive releases from the regional site.

231. *Id.* art. VI(p).

232. *Id.* art. VI(j), (o).

233. *Id.* art. VI(p). *See also* Southwestern Compact, art. 4(F)(9) (third-party liability fund may be used to satisfy liability claims only to the extent that such claims exceed the limits of the operator's insurance).

of LLRW to the site. Nonsited member states are authorized to meet this liability by levying generator surcharges.[234]

The Central Midwest Compact multi-layered system should serve as an excellent model for other regional compact members seeking to devise a viable system of guaranteeing liability funds and distributing the burden of the funding among operators, generators, and to a limited extent the states themselves.[235]

VII. Conclusion

The failure of states to develop new LLRW disposal sites in accordance with the LLRWPA has exposed the nation to a LLRW disposal crisis. The dearth of presently operating sites, combined with the ability of those sites to refuse extraregional waste, may lead to a proliferation of unregulated on-site LLRW storage, as well as a decline in the production and availability of useful radioactive substances.

In seeking a solution to the disposal crisis and in attempting to cooperate with the LLRWPA, it is important for states to fully evaluate their potential CERCLA liability for hazardous releases from state owned and controlled LLRW disposal sites. Only in this way can states protect themselves from unmanageable liability and also ensure that the environment will be adequately protected throughout the long life of the disposal facility.

Despite the dubious efficacy of the LLRWPA to date and the inevitability of state exposure to CERCLA liability for their activities at LLRW sites, the best public policy is to maintain the LLRWPA system of state control over LLRW and to hold states liable under CERCLA to the same extent as private parties. CERCLA liability need not be financially devastating nor serve as an obstacle to development of new LLRW sites. States have many options whereby they can

234. Central Midwest Compact, art. VI(q).

235. This approach may also avoid the problem encountered by several LLRW disposal sites which had severely inadequate perpetual care and maintenance funds when the sites closed in the 1970s. *See* Cohen, *supra* note 63, at 776-80.

limit their CERCLA liability, guarantee the availability of liability funds, and distribute the cost of CERCLA liability among site operators and waste generators, rather than state taxpayers.

APPENDIX A: LLRWPA INTERSTATE COMPACTS

Appalachian States Low-Level Radioactive Waste Compact
Pub. L. 100-319, § 5, 102 Stat. 471-82J (1988)
Delaware, Maryland, Pennsylvania, West Virginia

Central Interstate Low-Level Radioactive Waste Compact
Pub. L. 99-240, § 222, 99 Stat. 1864-71 (1986)
Arkansas, Kansas, Louisiana, Nebraska, Oklahoma

Central Midwest Interstate Low-Level Radioactive Waste Compact
Pub. L. 99-240, § 224, 99 Stat. 1880-92 (1986)
Illinois, Kentucky

Midwest Interstate Low-Level Radioactive Waste Compact
Pub. L. 99-240, § 225, 99 Stat. 1892-1902 (1986)
Indiana, Iowa, Minnesota, Missouri, Ohio, Wisconsin

Northeast Interstate Low-Level Radioactive Waste Mgmt. Compact
Pub. L. 99-240, § 227, 99 Stat. 1909-24 (1986)
Connecticut, New Jersey

Northwest Interstate Compact on Low-Level Radioactive Waste Mgmt.
Pub. L. 99-240, § 221, 99 Stat. 1860-63 (1986)
Alaska, Hawaii, Idaho, Montana, Oregon, Utah, Washington, Wyoming

Rocky Mountain Low-Level Radioactive Waste Compact
Pub. L. 99-240, § 226, 99 Stat. 1902-09 (1986)
Colorado, Nevada, New Mexico

Southeast Interstate Low-Level Radioactive Waste Compact
Pub. L. 99-240, § 223, 99 Stat. 1871-80 (1986)
Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, Virginia

Southwestern Low-Level Radioactive Waste Disposal Compact
Pub. L. 100-712, § 5, 102 Stat. 4773-83 (1988)
Arizona, California, North Dakota, South Dakota

APPENDIX B: COMPACT AFFILIATION BY STATE

Alabama	Southeast Compact
Alaska	Northwest Compact
Arizona	Southwestern Compact
Arkansas	Central Compact
California	Southwestern Compact
Colorado	Rocky Mountain Compact
Connecticut	Northeast Compact
Delaware	Appalachian Compact
District of Columbia	Unaffiliated
Florida	Southeast Compact
Georgia	Southeast Compact
Hawaii	Northwest Compact
Idaho	Northwest Compact
Illinois	Central Midwest Compact
Indiana	Midwest Compact
Iowa	Midwest Compact
Kansas	Central Compact
Kentucky	Central Midwest Compact
Louisiana	Central Compact
Maine	Unaffiliated
Maryland	Appalachian Compact
Massachusetts	Unaffiliated
Michigan	Unaffiliated
Minnesota	Midwest Compact
Mississippi	Southeast Compact
Missouri	Midwest Compact
Montana	Northwest Compact
Nebraska	Central Compact
Nevada	Rocky Mountain Compact
New Hampshire	Unaffiliated
New Jersey	Northeast Compact
New Mexico	Rocky Mountain Compact
New York	Unaffiliated
North Carolina	Southeast Compact
North Dakota	Southwestern Compact
Ohio	Midwest Compact
Oklahoma	Central Compact
Oregon	Northwest Compact

Pennsylvania	Appalachian Compact
Rhode Island	Unaffiliated
South Carolina	Southeast Compact
South Dakota	Southwestern Compact
Tennessee	Southeast Compact
Texas	Unaffiliated
Utah	Northwest Compact
Vermont	Unaffiliated
Virginia	Southeast Compact
Washington	Northwest Compact
West Virginia	Appalachian Compact
Wisconsin	Midwest Compact
Wyoming	Northwest Compact

APPENDIX C: COMPACT AFFILIATION BY COMPACT

APPALACHIAN STATES LOW-LEVEL RADIOACTIVE WASTE COMPACT

STATE	CITE
DELAWARE	DEL. CODE ANN. tit. 7 §§ 8001 to 8005 (1991 & 1993 Supp.)
MARYLAND	MD. CODE ANN., ENVIR. §§ 7-301 to 7-305 (1993)
PENNSYLVANIA	PA. STAT. ANN. tit. 35 § 7125.1 et seq. (1993)
WEST VIRGINIA	W. VA. CODE §§ 29-1H-1 to 29-1H-11 (1992)

CENTRAL INTERSTATE LOW-LEVEL RADIOACTIVE WASTE COMPACT

ARKANSAS	ARK. CODE ANN. §§ 8-8-201 to 8-8-206 (Michie 1993)
KANSAS	KAN. STAT. ANN. §§ 65-34a01 to 65-34a04 (1992 & 1993 Supp.)
LOUISIANA	LA. REV. STAT. ANN. §§ 30:2131 to 30:2134 (West 1989 & 1993 Supp.)
NEBRASKA	NEB. REV. STAT. § Vol. 2A Appendix BB (1989)
OKLAHOMA	OKLA. STAT. ANN. tit. 27A §§ 2-8-101 to 2-8-102 (West 1994)

CENTRAL MIDWEST INTERSTATE LOW-LEVEL RADIOACTIVE WASTE COMPACT

ILLINOIS	ILL. REV. STAT. 45 ILCS 140/1 to 141/51
KENTUCKY	KY. REV. STAT. ANN. § 211.859 (Michie/Bobbs-Merill 1991)

MIDWEST INTERSTATE LOW-LEVEL RADIOACTIVE WASTE COMPACT

INDIANA	IND. CODE ANN. §§ 13-5-9-1 to 13-5-9-14 (Burns 1990 & 1993 Supp.)
IOWA	IOWA CODE ANN. § 457B.1 (West 1993)
MINNESOTA	MINN. STAT. ANN. § 116C:833 (West 1987 & 1994 Supp.)
MISSOURI	MO. ANN. STAT. §§ 260.700 to 260.735 (Vernon 1990 & 1993 Supp.)
OHIO	OHIO REV. CODE ANN. §§ 3747.01 et. seq. (Page 1992)
WISCONSIN	WIS. STAT. ANN. §§ 14.81, 16.10 to 16.13 (West 1986 & 1993 Supp.)

NORTHEAST INTERSTATE LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT COMPACT

CONNECTICUT	CONN. GEN. STAT. §§ 22a-161 to 22a-162a (1985)
NEW JERSEY	N.J. STAT. ANN. § 32: 31-1 et. seq. (West 1990)

NORTHWEST INTERSTATE COMPACT ON LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT

ALASKA	ALASKA STAT. §§ 46.45.010 to 46.45.020 (1991)
HAWAII	HAW. REV. STAT. § 339K-1 et. seq. (1985)
IDAHO	IDAHO CODE §§ 39-3025 to 39-3030 (1993)
MONTANA	MONT. CODE ANN. §§ 75-3-501 to 75-3-502 (1993)
OREGON	OR. REV. STAT. § 469.930 (1991)
UTAH	UTAH CODE ANN. §§ 19-3-201 to 19-3-205 (1991)

WASHINGTON	WASH. REV. CODE ANN. §§ 43.145.010 to 45.145.020 (West 1983 & 1994 Supp.)
WYOMING	WYO. STAT. §§ 9-6-206 to 9-6-210 (1993)

ROCKY MOUNTAIN LOW-LEVEL RADIOACTIVE WASTE COMPACT

COLORADO	COLO. REV. STAT. §§ 24-60-2201 to 24-60-2212 (1988 & 1992 Supp.)
NEVADA	NEV. REV. STAT. §§ 459.007, 459.008 (1993)
NEW MEXICO	N.M. STAT. ANN. §§ 11-9A-1 to 11-9A-3 (Michie 1978 & 1993 Supp.)

SOUTHEAST INTERSTATE LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT COMPACT

ALABAMA	ALA. CODE §§ 22-32-1 to 22-32-9 (1990)
FLORIDA	FLA. STAT. ANN. §§ 404.30 to 404.31 (West 1993)
GEORGIA	GA. CODE ANN. §§ 12-8-120 to 12-8-123 (1993)
MISSISSIPPI	MISS. CODE ANN. §§ 57-47-1 to 57-47-9 (1989 & 1993 Supp.)
NORTH CAROLINA	N.C. GEN. STAT. §§ 104F-1 to 104F-5 (1990)
SOUTH CAROLINA	S.C. CODE ANN. §§ 48-47-10 to 48-47-340 (Law. Co-op. 1987 & 1993 Supp.)
TENNESSEE	TENN. CODE ANN. §§ 68-202-701 to 68-202-709 (1992 & 1993 Supp.)
VIRGINIA	VA. CODE ANN. §§ 10.1-1500 to 10.1-1504 (Michie 1993)

SOUTHWESTERN LOW-LEVEL RADIOACTIVE WASTE DISPOSAL COMPACT	
ARIZONA	ARIZ. REV. STAT. ANN. §§ 30-721 to 30-723 (1993)
CALIFORNIA	CAL. HEALTH & SAFETY CODE §§ 25877 to 25878.3 (West 1994)
NORTH DAKOTA	N.D. CENT. CODE § 23-20.5-01 (1991)
SOUTH DAKOTA	S.D. CODIFIED LAWS ANN. § 34-21B-3 (1993 Supp.)